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CATALOGUE

OF

BRITISH

ACULEATE HYMENOPTERA.

Tribe I. HETEROGYNA, Latr.

The economy of this tribe is greatly varied : some are excavators, which tunnel and burrow in the ground, while others do so in decaying trees or timber ; a considerable number construct nests suspended in trees. All the societies consist of males, females, and workers ; the latter are by some considered to be abortive females. The males are always winged, the females temporarily so.

Amongst the solitary species, the females are apterous.

DIV. II. HYMENOPTERA ACULEATA, Latr.

The species social or solitary ; the social communities consisting of males, females, and workers ; the latter individuals are barren.

Females : their antennæ 12-jointed ; their abdomen consisting of six segments, and furnished with a sting. *Males* : their an-

tennæ 13-jointed; their abdomen composed of seven segments, not furnished with a sting. Males, females and workers having four wings, which are always traversed by nervures, forming cells. Larva apodal; fed by the workers in social species, and upon food stored up by the female in solitary ones. Some of the solitary species parasitic.

Fam. 1. Formicidæ, Leach.

(SOCIAL ANTS.)

This family consists of the various species of Ants, with the number of which we are probably but slightly acquainted, although we have recorded 690 species. The metropolis of the group undoubtedly lies in the tropics; and when we reflect upon the observation of Mr. Bates, who has collected for some years in Brazil—"I think," says that observant naturalist, "the number in the valley of the Amazons alone cannot be less than 400 species"—if this prove to be the case, how limited must our present knowledge of the group be! The imagination is unable even to guess at the probable amount of species, when we remember that Mr. Bates is speaking of a single valley in Brazil; and were the vast expanse of South America, North America, Africa, Australia and its adjacent islands, India, and the other parts of Asia, searched by diligent naturalists, there can be little doubt that the *Formicidæ* would equal in number, if not exceed, that of any other tribe of insects.

The economy of the Ants, imperfectly as it is now recorded, has furnished some of the most interesting and wonderful histories to be met with in the natural history of insects. The industry of the ant is a household proverb: when their habitations are by any means injured or destroyed, no time is lost in useless despair—one spirit animates each individual—simultaneously they set to work to repair their misfortune—unceasingly they labour—nothing damps their ardour or abates their industry—until, as if by a magic hand, their habitation again rises to its former height and beauty, and all trace of ruin has disappeared.

It is not our province here to enter upon the wide field of economy as displayed in the exotic species of ants; but it appears necessary to mention one or two particular accounts, in order to give some faint idea of the important part which these creatures perform in the great scheme of nature. We may mention the "Driver or Visiting Ants of Africa:" these ants march in vast

armies, and their approach is welcomed by the negroes, who quit their dwellings for a time, the ants entering and destroying every species of vermin with which they may be infested, thus rendering incalculable service to the inhabitants.

The number of species at present discovered in this country is twenty-five, and as new ones are still being occasionally added, there is no doubt that the number will yet be considerably increased. With two exceptions, *F. rufa* and *F. congerens*, all the British species belong to the division of Mining Ants—one, *F. fuliginosa*, usually selecting decaying trunks of trees, posts, &c.: but this insect will in rare instances be found mining in banks or mud-walls; such occurrences are, however, seldom observed. The *F. flava* appears to differ in one point of its economy from all our native species—the last brood of workers are carried down into the deepest recesses of their subterranean dwelling, and there pass the winter months in a state of torpidity. I have found numbers in this situation in the depth of winter; and such larvæ are much more pubescent than we find them during the summer months. We have frequently inspected the dwellings of other species, *F. nigra*, *fusca*, and *cunicularia*, in winter, but never found either eggs or larvæ. The males and females of *F. flava* in a winged state are also found in the nest much later than any other species; we have found males as late as the 5th of November.

The *Formicidæ* may be divided into two great sections—those possessing a single scale or node at the base of the abdomen, and those in which the petiole is divided into two nodes. Of the former group only a single species, *Ponera contracta*, is furnished with a sting; whilst in the latter division the females and workers all possess that organ. This mode of subdivision, it must be remembered, is only applicable to the British species. As regards the species armed with stings, amongst the exotic group, several other genera having a single node in the petiole, are aculeate; and amongst the division possessing two nodes, the exotic genera *Ecodoma*, *Cryptocerus*, and some others, are stingless.

Genus 1. FORMICA.

Formica, pt., Linn. Faun. Suec. p. 426 (1761).

Lasius, pt., Fabr. Syst. Piez. p. 415 (1804).

The maxillary palpi 6-jointed; the labial palpi 4-jointed. Antennæ geniculated, 12-jointed in the females and workers, 13-jointed in the males. Ocelli three, placed in a triangle on the vertex; the eyes lateral and ovate. The superior wings

with one marginal, two submarginal, and one discoidal cell. The scale of the petiole flattened, forming a semicircular plate, varying in form. The pupæ enclosed in silken cocoons.

SUBDIVISION I.—*Males only slightly smaller than the females.*

1. *Formica rufa*.

Fœmina.—Rufo-ferruginea; fronte cum occipite, mesothorace supra, scutello, post-scutello, et abdomine supra fusco-nigris; clypei medio, palpis, antennis, mesothorace, tibiis tarsisque fuscescentibus; area frontali nitida; squama lata, subtriangulariter fere rotundata, margine supero inæquali; alis fusco-hyalinis, apicis subhyalinis.

Operaria.—Testaceo- vel rufo-ferruginea, nuda, lævissime cinereo-micans; fronte cum occipite et abdomine fusco-nigris; tibiis tarsisque fuscescentibus; squama, abdominis basi et ano rufo-maculatis.

Mas.—Nigro-fuscus, opacus, sparse pubescens; pedibus rufescentibus; area frontali nitida; squama subquadrata, humili, crassa, supra vix vel parum concaviuscula; valvula ventrali pilosula, sæpe rufescente.

Formica rufa, Linn. *Faun. Suec.* no. 1721; *Syst. Nat.* i. 962. 3.

Fabr. Syst. Ent. 391. 4; *Ent. Syst.* ii. 351. 8; *Syst. Piez.* 398. 11.

Schrank, Ins. Austr. no. 834.

Rossi, Faun. Etrusc. ii. 113. 836.

Don. Brit. Ins. xiv. 76. pl. 496 ♀.

Oliv. Enc. Méth. vi. 493. 14.

Latr. Hist. Nat. Fourm. p. 143. pl. 5. f. 28 ♂ ♀ ♀.

St. Farg. Hym. i. 201. 3.

Curtis, Brit. Ent. xvi. t. 752 ♂ ♀ ♀.

Zett. Ins. Lapp. 449. 5.

Brullé, Expéd. Sc. de Morée, iii. 327. 727.

Ratz. Forst. Ins. iii. 34. 1. t. 4. f. 10.

Nyl. Adno. Mon. Form. Bor. 902. 5; *Form. Fr. et d'Algér.* 60. 14.

Foerst. Hym. Stud. Form. p. 13. 3.

Schenck, Besch. Nass. Ameis. 25.

Smith, Brit. Form. Trans. Ent. Soc. Lond. iii. n. s. 100. 1;

Cat. Form. p. 2.

Mayr. Form. Austr. p. 56. 9; *Ungar. Ameis.* 9. 9,

Formica dorsata, Panz. *Faun. Germ.* 54. 1 ♀.

Formica obsoleta, Zett. *Ins. Lapp.* 449. 5 ♀ ♀.

Formica lugubris, Zett. *Ins. Lapp.* 449. 6 ♂.

Formica truncicola, Foerst. *Hym. Stud. Form.* 21.

Formica polycetena, Foerst. *Hym. Stud. Form.* p. 15. 4.

Schenck, Besch. Nass. Ameis. p. 28.

Formica piniphila, Schenck, *Beschr. Nass. Ameis.* p. 28.

Female. Length $4\frac{1}{2}$ –5 lines.—Head and thorax rufo-ferruginous; the antennæ, the head above their insertion, the middle of the clypeus, more or less, and the mesothorax, fuscous and subopaque; the scutellum and abdomen shining black; the tibiæ, tarsi, and tips of the femora rufo-fuscous; the femora, scale of the petiole and base of the abdomen rufo-ferruginous; the wings white-hyaline, more or less tinted with brown towards their base.

Worker major. Length $3\frac{1}{2}$ lines.—Rufo-ferruginous; the antennæ, the head above their insertion, the pro- and mesothorax more or less above, the legs and abdomen, nigro-fuscous and subopaque; the frontal area shining; the articulations of the legs usually ferruginous; the scale of the petiole subrotundate, slightly notched above, or sometimes obtusely emarginate.

Worker minor. Length 2– $2\frac{1}{2}$ lines.—Frequently of a darker hue than the large worker, but sometimes of the same colour.

Male. Length $4\frac{1}{2}$ lines.—Nigro-fuscous, with the legs rufous; the base of the femora, the tibiæ and tarsi more or less fuscous; wings as in the female.

This species, which is known popularly as the Wood-ant, the Horse-ant, and Hill-ant, is found in all parts of the country; it sometimes avails itself of the hollow trunk of a tree, in which it constructs its heaped-up nest. In some colonies individuals are to be found with the head and thorax blood-red; these are, no doubt, recently developed specimens, but they so closely resemble examples of *F. sanguinea*, that, without careful examination, they might be mistaken for that species. The nests of *F. rufa* are resorted to by numerous species of Coleoptera, some of which, belonging to the Brachelytra, may be in some way conducive to the welfare of the communities—in all probability yielding secretions which serve as food to the young brood. I have not detected *Aphides* in the nests of this species, but the workers may be commonly observed in constant attendance upon them, on plants and shrubs in woods near to their habitations. *Aphides* are frequently met with in the nests of *F. flava*. In the nests of *F. rufa* may also occasionally be found communities of the allied genus *Myrmica*: *M. nitidula* has been taken on several occasions; and I have met with *M. lœvinodis* living in perfect harmony with *F. rufa* in the heart of the nest.

2. *Formica congerens*.

Fœmina.—Rufo-ferruginea, cinereo-micans; capite supra, mesothorace dorso et abdomine fusciscentibus; antennis, tibiis tarsisque fusco-nigris; area frontali nitida; oculis parce pilosulis.

Mas.—Nigro-fuscus, parum cinereo-micans; capite thoraceque pubescentibus.

- Formica congerens*, *Nyl. Adno. Mon. Form.* 906. 7; *Addit. Alter. Mon. Form.* p. 30; *Form. Fr. et d'Algér.* 61. 15.
Foerst. Hym. Stud. Form. 17. 5.
Schenck, Besch. Nass. Ameis. p. 30.
Mayr. Form. Austr. 60. 10; *Ungar. Ameis.* 10. 10.
Smith, Trans. Ent. Soc. Lond. n. s. iv. pt. 7.

Female. Length $4\frac{1}{2}$ –5 lines.—Rufo-ferruginous, and with a fine thin shining cinereous pile; the head above the antennæ, the mesothorax, scutellum and post-scutellum dark fuscous, nearly black; the abdomen dark fuscous, with the base ferruginous; the tibiæ and tarsi dark rufo-fuscous; the frontal area shining; the eyes slightly pilose; the scale of the petiole slightly emarginate above.

Worker major and minor.—The same size and colour as *F. rufa*, but distinguished by the cinereous pilosity which covers the entire insect; and the abdomen is not shining, as in *F. rufa*.

Male.—The same size and colour as *F. rufa*, but readily distinguished by its pilose head and thorax; the eyes are also pubescent.

This insect so closely resembles the Wood-ant, that it has no doubt been overlooked by entomologists as a distinct species; it was taken at Loch Rannoch in Perthshire by a working collector. Dr. Nylander says it forms similar nests to *F. rufa*. It will probably prove to be a generally distributed species, if the attention of entomologists could be directed to the observation of these interesting insects.

3. *Formica sanguinea*.

Fœmina.—Rufo-ferruginea, lævissime cinereo-micans; fronte cum vertice et abdomine nigro-fuscis; squama subtriangulariter rotundata, margine supra rotundata vel leviter emarginata; alis a basi ad medium pallide rufescentibus.

Operaria.—Capite, thorace pedibusque sanguineis; clypei mar-

gine leviter emarginata; area frontali opaca; abdomine nigro-fusco.

Mas.—Fusco-niger; pedibus pallide rufescentibus; clypeo obsolete emarginato; squama supra crassa, transversim subrect-angulari, supra integra vel late subemarginata; area frontali opaca.

Formica sanguinea, Latr. *Hist. Nat. Fourm.* p. 150. pl. 5. f. 29 ♂.

Jurine, *Hym.* p. 272.

St. Farg. *Hym.* i. 203. 4 ♂ ♀ ♂.

Foerst. *Hym. Stud. Form.* p. 20. 6.

Schenck, *Beschr. Nass. Ameis.* p. 36.

Smith, *Brit. Form.* 101. 2.

Mayr. *Form. Austr.* p. 64. 12; *Ungar.* *Ameis.* p. 10. 12.

Nyl. Form. Fr. et d'Algér. p. 62. 16.

Formica dominula, *Nyl. Adno. Mon. Form. Bor.* p. 905. 6.

Female. Length 4-4½ lines.—Blood-red, and covered with a fine cinereous pile; the face above the insertion of the antennæ, the vertex, and the abdomen, black, with more or less of a reddish tinge; the anterior margin of the clypeus distinctly emarginate; the thorax with usually two or sometimes three indistinct fuscous stripes, but frequently immaculate; the wings more or less brown towards their base; the superior margin of the scale of the petiole rounded, or sometimes slightly emarginate.

Worker. Length 3-4 lines.—Blood-red, with the abdomen black and covered with cinereous pile. The *worker minor* has usually the crown of the head, the disk of the thorax, and the legs slightly fuscous; the scale of the petiole and the anterior margin of the clypeus emarginate.

Male. Length 4 lines.—Very like the male of *F. rufa*, but with the legs entirely red and the flagellum fusco-ferruginous; the clypeus obsoletely emarginate; the mandibles longitudinally rugose; the scale of the petiole emarginate above, its entire width.

This species has not occurred in the immediate vicinity of London, but is very plentiful in many localities; it has been taken at Weybridge; Hawley, Hants; New Forest, &c. This insect plunders the nests of other species, carrying off their pupæ, which, being developed in their nests, become the slaves of *F. sanguinea*. I have found workers of *F. fusca*, *F. cunicularia*, and *F. flava* in their nests, also a few workers of *Myrmica scabrinodis*. This species constructs its galleries in banks; its large workers are a bold and courageous race, attacking with great fury.

4. *Formica cunicularia*.

Fœmina.—Rufo-ferruginea, cinereo-micans; palpis, antennarum flagellis abdomineque fusco-nigris; mesothorace maculis tribus longitudinalibus, prima antica mediana, duabusque alteris lateralibus, scutello, post-scutello, mesosterno, tarsorum apicibus fuscis; squama lata, subcordata vel supra truncata, tantum leviter inæquali; alis hyalinis, basi parum fumatis; nervis et stigmatibus fusco-ferrugineis.

Operaria.—Rufo-ferruginea, cinereo-micans; capite supra, flagellis et abdomine fusco-nigris.

Mas.—Niger, cinereo-micans; pedibus rufo-testaceis; oculis nudis; squama supra late concava; disco fere toto subrotundato, plane impressiusculo.

Formica cunicularia, *Latr. Hist. Nat. Fourm.* p. 151.

Hub. Rech. Fourm. t. 2. f. 11-13.

Losana, Form. Piem. 316. 10.

St. Farg. Hym. i. 203. 5.

Nyland. Adno. Mon. Form. 913. 11; *Form. Fr. et d'Algér.* 64. 18.

Foerst. Hym. Stud. Form. 25. 9.

Smith, Brit. Form. p. 103.

Formica stenoptera, *Foerst. Hym. Stud. Form.* 26. 10.

Female. Length 4 lines.—The anterior margin of the clypeus angulated, the middle subcarinated, with the sides oblique, the anterior margin rounded; the clypeus, sides of the face, mandibles, and base of the flagellum, rufo-ferruginous; thorax frequently entirely fuscous above, but sometimes with three fuscous stripes; the legs ferruginous, with the apical joints of the tarsi fuscous. Abdomen: the base and apex usually more or less ferruginous.

Worker. Length 3-3½ lines.—Resembles small dark specimens of *F. rufa*; but the antennæ are more slender, as well as the legs; the facial area is not shining; the thorax above, and the tibiæ and tarsi above, more or less fuscous; the apical margins of the segments of the abdomen are more or less distinctly rufo-piceous, the extreme apex pale ferruginous.

Male. Length 3½ lines.—Very closely resembles that of *F. fusca*, but has the scale of the abdomen transverse, and emarginate above its entire width, the angles of the emargination obtuse; the antennæ are more slender, the scape longer, and the face rather less produced before the eyes than in *F. fusca*.

Very closely resembles the male of *F. fusca*; but the form of the scale of the petiole is different, being transverse, with its upper margin emarginate its entire width, the lateral angles oblique, and the sides straight.

Not so generally distributed as *F. fusca*, but occurring in the vicinity of the metropolis not uncommonly, particularly in the neighbourhoods of Highgate and Hampstead. It is found at Southend, Deal, Dover, Weybridge, Isle of Wight, &c. All the sexes may be found in the nests during the month of August.

5. *Formica fusca*.

Fœmina.—Fusco-nigra, nitida, cinereo-micans, parce pilosa; mandibulis rufescentibus; scapis antennarum pedibusque rufo-testaceis; alis hyalinis, nervis et stigmatibus fuscis; squama lata, subtriangulariter subrotundata; abdomine ovato, subnudo.

Operaria.—Nigra vel fusco-nigra, cinereo-micans; mandibulis, antennarum scapis, flagellorum basi et pedibus rufo-piceis; squama triangulariter subrotundata.

Mas.—Fusco-niger, nitidus, cinereo-micans; antennis pedibusque pallide rufescentibus; squama subrotundata, margine supra leviter emarginata.

Formica fusca, Linn. *Faun. Suec.* 226. no. 1722; *Syst. Nat.* i. 963. 4.

Fabr. Ent. Syst. ii. 352. 11; *Syst. Piez.* 399. 13.

Latr. Hist. Nat. Fourm. p. 156. t. 6. f. 32 ♂ ♀.

Huber, Rech. Fourm. t. 2. f. 8 ♀, 9 ♀, 10 ♂.

Zett. Ins. Lapp. p. 448.

Brullé, Hist. Nat. Il. Canar. iii. 84. 3.

Losana, Form. Piem. p. 317. 12.

St. Farg. Hym. i. 205. 6.

Nyl. Adno. Mon. Form. Bor. p. 919. 15; *Addit. Alter.* 30;

Form. Fr. et d'Algér. 65. 20.

Schenck, Besch. Nass. Ameis. 43.

Smith, Brit. Form. p. 104. 4.

Mayr. Form. Austr. 74. 17.

Formica glebaria, *Nyl. Adno. Mon. Form. Bor.* 917. 14.

Foerst. Hym. Stud. Form. 31. 13.

Female. Length $3\frac{1}{2}$ lines.—Black or blackish brown, with a thin shining cinereous pile, which gives the insect an olive tinge; the mandibles, antennæ and legs obscure rufo-testaceous, the tibiæ and tarsi palest; the legs altogether pale in very fresh specimens; the anterior margin of the clypeus entire; the frontal area not shining; the wings hyaline and iri-

descent, with the nervures and stigma fusco-testaceous; abdomen ovate, with the apical margins of the segments narrowly and obscurely rufo-piceous, the upper margin of the scale rounded and entire.

Worker. Length 2-3½ lines.—Of the same nigro-æneous colour as the female; the clypeus obsoletely carinated in the middle; the scale of the petiole, in the large worker, sometimes slightly emarginate. The small worker has the legs and antennæ usually paler than in the larger individuals.

Male. Length 3½-4 lines.—Black and shining, with an æneous tinge; the legs and apex of the abdomen pale rufo-testaceous; the scale thickened, subrotundate and widely emarginate above.

A very abundant species, found in banks, preferring those which have a southern aspect, in which it constructs beautiful and intricate galleries and passages. The nests of this species frequently contain some of the rarest of our Myrmecophilous beetles.

SUBDIVISION II.—*The males much smaller than the females.*

6. *Formica fuliginosa.*

Fœmina.—Nigra, nitidissima; mandibulis, antennis pedibusque rufescentibus; tarsis, pedum articulis pallide rufescentibus; capite subcordato; squama parva, subovata; alis hyalinis, basi ad medium brunnescentibus, nervis et stigmate obscuris.

Operaria.—Nigra, nitidissima; mandibulis, antennarum flagellis rufescentibus, tarsis pallide rufis; capite magno, subcordato; ocellis minutis; clypeo subcarinato; squama parva, subovata, marginibus lateralibus parallelis.

Mas.—Piceo-niger, nitidus; flagellis, pedum articulis et tarsis pallescentibus; squama parva, subquadrata, parum rotundata; alis sicut in fœmina.

Formica fuliginosa, Latr. *Hist. Nat. Fourm.* p. 140. pl. 5. f. 27, A. B ♀, C. D ♂, F ♀.

Losana, *Form. Piem.* p. 315. 9.

St. Farg. Hym. i. 200. 2.

Schill. Bemerk. Schles. 55.

Nyl. Adno. Mon. Form. Bor. p. 915. 12; *Form. Fr. et d'Algér.* 66. 23.

Myrmica fuliginosa, Foerst. *Hym. Stud. Form.* 28. 17.

Schenck, Besch. Nass. Ameis. 45.

Smith, Brit. Form. p. 105. 5.

Mayr. Form. Austr. 79. 19.

Female. Length $2\frac{1}{2}$ lines.—Shining black, or sometimes nigropiceous; the mandibles, antennæ and legs obscure ferruginous, with the flagellum beneath, the tarsi and articulations of the legs pale rufo-testaceous; the head emarginate behind; the wings hyaline, with the basal half smoky; the scale of the petiole small, oblong, rounded and ciliated above. Abdomen oblong-ovate, as long as the thorax, slightly pubescent, the extreme apex testaceous.

This species is at once recognized by its jet-black colour. Its usual habitat is the vicinity of a decaying tree or an old post; its movements are extremely slow as compared with any other species: numbers may frequently be observed, congregated in masses in the vicinity of the nest, apparently sunning themselves—not, like other species, incessantly at work. I have once or twice found colonies of this ant formed in a hard sand-bank, but such occurrences are unusual. The males and females may be found about the end of June. There is scarcely any perceptible difference in the size of the workers, and the females are very little larger than the working ants; the latter in other respects exactly resemble the females.

7. *Formica brunnea*.

Femina.—Fusco-nigra, cinereo-micans; antennis pedibusque pallide testaceis, flagellis et femoribus paullo obscurioribus; capite thoracis latitudine; scapis et tibiis denudatis; squama leviter emarginata.

Operaria.—Pallide vel cinerascienti-rufa; abdomine fusco; sulco frontali elongato.

Mas.—Fusco-niger; antennarum flagellis, pedum articulis tarsisque testaceis; oculis nudis; squama emarginata; alis hyalinis, basi ad medium infuscatis.

Formica brunnea, Latr. *Hist. Nat. Fourm.* p. 169. pl. 6. f. 35 ♀.

Losana, Form. Piem. p. 319. 13.

Nyl. Form. Fr. et d'Algér. 68. 27.

Mayr. Ungar. Ameis. p. 13. 21.

Formica timida, Foerst. *Hym. Stud. Form.* 35. 15.

Schenck, Besch. Nass. Ameis. 53.

Mayr. Form. Austr. 89. 23 ?

Female. Length 3 lines.—Brown-black; the mandibles, antennæ and legs pale ferruginous; the flagellum, tibiæ and tarsi darkest; the antennæ and legs destitute of pubescence; the head as wide as the thorax and slightly emarginate behind; wings hyaline, with the basal half fuscous.

Worker. Length $1\frac{1}{2}$ –2 lines.—Rufo-testaceous; the vertex brownish; the front with a conspicuously impressed line.

Male. Length 2 lines.—Nigro-fuscous or brownish black; the antennæ and legs pale fusco-testaceous; a deeply impressed line in front of the anterior ocellus; the scale notched above, the basal half brownish.

This species has long been enumerated in the list of native ants, but the species which represented it was the *F. umbrata* of Nylander. The only specimen captured in this country, that I have seen, was taken by myself on the sand-hills at Deal; it was not recognized at the time of capture, or probably it would have been found, on searching, not uncommon in that locality. The *F. emarginata* will very probably be found in England; and I should have included it, had not the specimen in the Kirbyan collection ticketed "*emarginata*" been a worker of *F. sanguinea*. Latreille says *F. emarginata* was sent to him from England by Mr. Kirby, but no specimens exist in the collection; I therefore leave it for its next discoverer to add to our British *Formicidæ*.

8. *Formica nigra*.

Fœmina.—Fusco-nigrescens, nitida, dense undique cinereo-micans; mandibulis antennisque obscure rufescentibus; pedum articulis tarsisque pallide rufescentibus; capite thorace angustiore; alis lacteo-albis, nervis et stigmate pallide testaceis; squama verticaliter subrectangulari, supra angulis rotundatis et medio subangulatim emarginata.

Operaria.—Fusco-nigra, cinereo-micans, nitida, sparse pilosula; antennarum scapis et mandibulis rufescentibus; tarsis et pedum articulis pallide testaceis; squama subrectangulari, supra parum vel vix emarginata.

Mas.—Niger vel fusco-niger, parum cinereo-micans; nitidus; antennarum flagellis fusciscentibus, articulo primo crassiusculo; squama parva, transversim subrectangulari, supra parum concaviuscula.

P R E F A C E.

THIS Catalogue contains descriptions of all the known species of Fossorial Hymenoptera, Formicidæ, and Vespidæ, which have been discovered in Great Britain. The habits of the genera and the peculiar æconomy of individual species are given, as far as the observations of several years have enabled the Author to record them. Great attention has been paid to the synonymy, in the hope of rendering it as perfect as possible; and almost every species has been carefully compared with continental specimens obtained from the best authorities.

JOHN EDWARD GRAY.

Dec. 15th, 1858.

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CATALOGUE

OF

BRITISH FOSSORIAL HYMENOPTERA,
FORMICIDÆ, AND VESPIDÆ,

IN

38623

THE COLLECTION ^{we}

OF THE

BRITISH MUSEUM.

BY

FREDERICK SMITH, V.P.E.S.

LONDON:

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1858.

Formica nigra, Linn. *Faun. Suec.* p. 427, 1723; *Syst. Nat.* i. 963. 4.

Scop. Ent. Carn. p. 834.

Fabr. Syst. Ent. 392. 6; *Ent. Syst.* ii. 352. 10.

Losana; Form. Piem. 317. 11.

Latr. Hist. Nat. Fourm. 156.

St. Farg. Hym. i. 206. 7.

Nyland. Adno. Mon. Form. Bor. 920. 16; *Form. Fr. et d'Algér.* 67. 24.

Schenck, Besch. Nass. Ameis. 49.

Smith, Brit. Form. p. 109. 8.

Mayr. Form. Austr. p. 83. 20.

I. asius niger, *Fabr. Syst. Piez.* 415. 1.

Formica fusca, *Foerst. Hym. Stud. Form.* p. 83.

Female. Length $3\frac{1}{2}$ –4 lines.—Fuscous, and covered with shining silky cinereous pile; the mandibles, anterior margins of the face, the flagellum, articulations of the legs and the tarsi pale testaceous; head narrower than the thorax, the latter as well as the scutellum smooth and shining above; wings milky-white and iridescent, the nervures yellow-testaceous. Abdomen oblong-ovate, the scale emarginate above, the lateral angles rounded, the sides nearly straight.

Worker. Length $1\frac{1}{2}$ –2 lines.—Of the same colour as the female; the ocelli very minute; the scale of the petiole very minutely notched above; the thorax usually fusco-testaceous; the margins of the apical segments of the abdomen slightly ciliated with short pale glittering hairs.

Male. Length $1\frac{1}{2}$ –2 lines.—Dark fuscous; the antennæ and legs pale rufo-testaceous; a distinctly impressed line before the anterior ocellus; the scape and the tibiæ slightly pubescent; the scale of the petiole small and very slightly emarginate above; wings as in the female, but frequently having the discoidal cell obsolete.

This is a most abundant species, and is found everywhere; it is plentiful even in London gardens and squares, and is commonly known as the Garden-ant; although its usual habit is to build in banks, it is frequently found in walls of gardens and out-houses. In the month of September 1855, I observed at Dover immense clouds of this ant passing over the town towards the sea; and subsequently, on passing along the beach, I observed a line of their floating bodies extending from the town at least a mile towards St. Margaret's—the line consisted of males and females, and was about a yard broad.

9. *Formica umbrata*.

Fœmina.—Luteo-fusca, cinerascenti-sericea, pilis brevibus adspersis pallide fuscis; oris partibus, antennis pedibusque pallide testaceis; capite thorace paululum latiori; oculis hirtulis; alis albescenti-hyalinis, a basi fere ad medium fusco-umbratis, nervis brunnescentibus, stigmate fusco; squama obtuse angulatim emarginata.

Operaria.—Flava; oculis parcissime hirtulis; corporis pube sericea subtiliori, pilis brevibus erectis sparsis paullo brevioribus, rigidiusculis.

Mas.—Fusco-niger, nitidus, tenuissime cinerascenti-sericeus et pilosulus; palpis, antennarum flagellis, pedum articulis tarsisque testaceo-pallescentibus; oculis hirtulis; linea frontali distincte impressa; alis a basi ad medium infuscatis; squama subovali, apice subangulatim emarginata.

Formica umbrata, *Nyl. Addit. Mon. Form. Bor. Eur.* p. 1048;

Form. Fr. et d'Algér. p. 70. 29.

Smith, Brit. Form. p. 106. 6.

Foerst. Hym. Stud. Form. p. 39. 18.

Schenck, Besch. Nass. Ameis. p. 59. *

Mayr. Form. Austr. p. 93. 25.

Formica mixta, *Foerst. Hym. Stud. Form.* p. 41 & 72.

Formica affinis, *Schenck, Nass. Ameis.* p. 62, var. ?

Mayr. Form. Austr. p. 96, var. ?

Formica brunnea, *Smith, Cat. Brit. Hym.* p. 2. 4. *

Female.—Fuscous-yellow, densely covered with a fine cinereous pile; head a little wider than the thorax; mandibles with elongate punctures, their teeth black; the antennæ, face beneath their insertion, and the legs pale reddish yellow; the scape and the legs pubescent as well as the eyes; the scale of the petiole widely but not deeply emarginate above.

Worker.—Extremely like the *F. flava*, but with the eyes, scape of the antennæ, and the tibiæ pubescent.

Male.—Blackish brown, slightly pilose; the antennæ and legs brown, with the flagellum, articulations of the legs, and the tarsi pale; the eyes pilose; a distinctly impressed line in front of the anterior stemma; the basal half of the wings brown, the nervures testaceous, the stigma darker.

This insect is very like the *F. flava*. The male and female are easily distinguished by the dark-brown base of their wings, and also by their pubescent eyes; the latter character is not easily

detected, as it requires a high magnifying power to distinguish the hairs. The female is readily known from the same sex of *F. flava* by its head being as wide or rather wider than the thorax; in *F. flava* it is considerably narrower. The worker is difficult to distinguish: the pubescent eyes, scape of the antennæ, and the tibiæ are the best distinctions; but even these are not to be relied upon when examining large workers of *F. flava*, which are also pubescent. The species is not uncommon, so that all the sexes can be obtained from the nest.

10. *Formica flava*.

Fœmina.—Fusca, nitida, dense flavido-sericea; antennis pedibusque pallidis; alis hyalinis, basin versus parum infuscatis, nervis et stigmatibus flavido-testaceis; capite thorace angustiore; squama subovali, supra late obtuse angulatim emarginata.

Operaria.—Flavo-testacea, lata, nitida, sericeo-micans sparseque flavido-pilosula; oculis minutis, ocellis minutissimis aut nullis; squama parva, subovali, supra rotundata vel truncata.

Mas.—Fusco-niger, nitidissimus; palpis, antennarum flagellis, pedum articulis et tarsis flavido-testaceis; fronte media levissime transversim subimpressa; alis subhyalinis, nervis pallide testaceis, quandoque pallide fusciscentibus; squama subquadrata.

Formica flava, *De Geer*, *Ins.* ii. 1089. 5. t. 42. f. 24–28.

Fabr. Ent. Syst. ii. 357. 34; *Syst. Piez.* p. 406. 44.

Latr. Hist. Nat. Fourm. p. 106. pl. 6. fig. 36, A ♀, B ♂, E ♂.

Losana, Form. Piem. p. 331. 17.

St. Farg. Hym. i. 208. 9.

Nyl. Adno. Mon. Form. Bor. Eur. p. 922. 17; *Form. Fr. et d'Algér.* p. 69. 28.

Foerst. Hym. Stud. Form. p. 38. 17.

Schenck, Besch. Nass. Ameis. p. 56.

Smith, Brit. Form. p. 108. 7.

Mayr. Form. Austr. p. 91. 24.

Female. Length 3 lines.—Fuscous; the face below the insertion of the antennæ, the palpi, antennæ and legs pale yellow-testaceous; clothed with a fine yellow silky pile; the head much narrower than the thorax; wings hyaline, faintly smoky at their base; the scale of the petiole widely but slightly emarginate. Abdomen ovate, with its apex pale testaceous yellow.

Worker. Length $1\frac{1}{3}$ –2 lines.—Yellow; the small workers pale

yellow; the ocelli extremely minute, not discernible in small examples; eyes small; scale of the petiole small, its superior margin slightly emarginate or nearly truncate; the scape and the tibiæ naked.

Male. Length $1\frac{1}{2}$ line.—Brownish black, with a sparing cinereous pile, most dense on the head and abdomen, very smooth and shining; the articulations of the legs and the tarsi pale testaceous; wings white-hyaline, with the nervures pale testaceous; the scape and the legs not pubescent; the usual impressed line in front of the anterior stemma obsolete.

This species can only be confounded with *F. umbrata* amongst the known British species; but the differences pointed out under that insect will help to separate them. The male of *flava* may be known by its wanting the brown base to the wings and the impressed line in front of the anterior stemma. *F. flava* is abundant everywhere: in meadows and on heaths, &c. it raises its little mounds, which serve to carry off the rain from its dwelling; whilst it will be found in hilly districts to avail itself of the protection of a stone or other substance, under which it constructs its roads and nurseries; it is in such situations that *Claviger testaceus* and other Myrmecophilous beetles are most easily procured. This species is sometimes found occupying one side of a hillock, whilst *Myrmica scabrinodis* appropriates the other.

Genus 2. TAPINOMA.

Formica, pt., *Latr. Hist. Nat. Fourm.* 182 (1802).

Tapinoma, *Foerst. Hym. Stud. Form.* 43 (1850).

Maxillary palpi 6-jointed, labial palpi 4-jointed; antennæ inserted in the middle of the face; eyes rather within the sides of the head, placed a little before the middle; the scale of the petiole oblong and decumbent; ocelli obliterated in the workers; wings as in *Formica fusca*.

This genus only differs from *Formica* in slight characters; the flagellum is nearly filiform, and the decumbent scale is a marked character.

1. *Tapinoma erratica*.

Femina.—Nigro-fusca, cinerascens-micans, pilositate abdominis dorso vix conspicua; pedum articulis tarsisque pallidis; metathorace dorso abbreviato; squama oblonga, depressa; clypei

marginē leviter exsecta; alis hyalinis, nervis et stigmatibus pallide fuscis.

Operaria.—Nigra, nitida, glabra; pedibus fuscis, articulis tarsisque pallidis; squama sicut in fœmina.

Mas.—Niger, nitidiusculus; antennis thorace longioribus; mandibulis multidentatis, apice acutissime, pedum articulis tarsisque pallide rufescentibus; squama crassa, oblonga, supra rotundata; alis fusco-hyalinis; abdomine oblongo-ovato.

Formica erratica, Latr. *Hist. Nat. Fourm.* p. 182 ♂.

Nyl. Form. Fr. et d'Algér. p. 71.

Formica glabella, Nyl. *Addit. Alt. Mon. Form. Bor.* p. 38.

Tapinoma collina, Foerst. *Hym. Stud. Form.* p. 43.

Schenck, Beschr. Nass. Ameis. p. 67.

Tapinoma erratica, Smith, *Brit. Form.* p. 111. 1.

Tapinoma erraticum, Mayr. *Form. Austr.* p. 101. 1.

Female. Length 2–2½ lines.—Black, smooth and shining, with a fine thin cinereous pile, frequently more or less obliterated; the articulations of the legs and the tarsi pale rufo-testaceous; the clypeus notched in the middle of its anterior margin; scale of the petiole decumbent, hidden beneath the basal segment of the abdomen.

Worker. Length 1½ line.—Black, smooth and shining, with a slight cinereous glittering pile; mandibles, antennæ and legs dark fuscous, the articulations of the latter and the tarsi pale testaceous; the extreme base of the scape and the teeth of the mandibles ferruginous; the thorax compressed slightly behind; the scale of the petiole decumbent, as in the female. In some individuals the thorax is obscure rufo-testaceous as well as the legs.

Male. Length 2 lines.—Black, or obscure fuscous, very slightly pilose; antennæ longer than the head and thorax; the ocelli prominent and glassy bright; the articulations of the legs and the tarsi pale; wings fusco-hyaline, their nervures and stigma fusco-testaceous; scale of the abdomen incrassate, decumbent, but not concealed, as in the worker. Abdomen elongate-ovate, the margins of the segments very narrowly and obscurely testaceous.

This insect was first captured in this country by Mr. Dale, who took specimens at Bournemouth, and also in Scotland; it is widely distributed, as Mr. Grant found it at Coombe Wood and also at Weybridge. Mr. S. Stevens has met with it near Guildford, Surrey.

2. *Tapinoma polita*.

Operaria.—Rufo-testacea, lævis, tota nitidissima nuda; antennis filiformibus; mandibulis, pedum articulis tarsisque pallide testaceis.

Tapinoma polita, *Smith, Brit. Form. Trans. Ent. Soc. n. s. iii. 112. 2.*

Worker. Length $1\frac{1}{2}$ line. — Rufo-testaceous, smooth and shining; head elongate, with a few scattered long hairs, and slightly emarginate behind; the scape as long as the head; the flagellum about the same length, the two apical joints slightly thickened; thorax narrowed behind, and slightly strangulated between the meso- and metathorax, the latter emarginate behind, with the lateral angles rounded; the scale decumbent, rounded above; abdomen ovate, sprinkled with a few long hairs.

The only specimen that I have seen of this insect is in the collection of J. C. Dale, Esq., who took it in Wales. The *T. nitens* of Mayr. is most like it; but the scape of that insect is distinctly shorter than the flagellum, and the scale is of a different form, being wider above.

Fam. 2. Poneridæ, *Smith*.

The abdomen with a single scale or node; the females and workers furnished with a sting.

Genus 1. PONERA.

Formica, pt., *Latr. Hist. Nat. Fourm. p. 195 (1802).*

Ponera, *Latr. Gen. Crust. et Ins. iv. 128 (1804).*

The maxillary palpi two-jointed, the labial palpi two-jointed; ocelli and eyes obsolete in the workers; the mandibles dilated and dentate on their inner margin. The scale of the petiole thickened, nodiform; the first segment of the abdomen more or less constricted; females and workers furnished with a sting. Anterior wings with one marginal, two complete submarginal, and one discoidal cell.

These characters are only applicable to the British, and one or two known exotic species; nearly all the latter have four-jointed maxillary palpi,—the workers having eyes, but not ocelli.

1. *Ponera contracta*.

Fœmina.—Fusca; mandibulis, clypeo, antennis pedibusque pallide rufis; oculis subovalibus, hirtulis; ocellis distinctis; capite magno; alis hyalinis; abdomine elongato, apice pallide testaceo.

Operaria.—Fusco-brunnea, subnitida, pube cinerascens; antennis, clypeo, mandibulis, pedibus et abdominis apice rufopallidis; alis hyalinis.

Mas.—Niger, nitidus; pedibus fuscis; mandibulis, tibiis tarsisque rufescentibus; antennis elongatis, scapo minimo, reliquis articulis cylindricis; oculis valde prominulis, ocellis sat magnis; squama petioli crassa, segmento ultimo processu spiniformi deorsum flexo; alis hyalinis.

Formica contracta, *Latr. Hist. Nat. Fourm.* p. 195. t. 7. f. 40 ♂.

Fabr. Syst. Piez. p. 410. 58.

Ponera contracta, *Latr. Gen. Crust. et Ins.* iv. 128.

St. Farg. Hym. i. 195. 8.

Steph. Ill. Brit. Ent. Supp. p. 15. t. 42. f. 2.

Foerst. Hym. Stud. Form. p. 45.

Schenck, Nass. Ameis. 72.

Smith, Brit. Form. p. 113.

Mayr. Form. Austr. p. 116. 1.

Nyland. Form. Fr. et d'Algér. p. 75. 1.

Female. Length $1\frac{1}{2}$ line.—Shining rufo-fuscos, elongate and subcylindric; the antennæ, clypeus and mandibles rufo-testaceous; the eyes ovate, placed anteriorly at the sides of the head; the antennæ approximating at their base; the ocelli in a triangle on the vertex, which is emarginate behind; a longitudinal impressed line runs from the anterior stemma to the insertion of the antennæ, the latter clavate. Thorax oblong-ovate, the metathorax obliquely truncate; the scutellum, post-scutellum and legs rufo-testaceous. Abdomen: the scale of the petiole incrassate, vertical, its superior margin rounded, as high as the first segment; a constriction between the first and second segments; the apex of the abdomen pale rufo-testaceous; wings hyaline.

Worker.—Very like the female, and only differs in being smaller, in having the thorax gradually narrowed behind, and in having the eyes and ocelli obsolete.

Male.—Shining black, with the legs fuscous; the mandibles and tarsi pale testaceous; the scape of the antennæ very short; the eyes large and prominent; the scale of the petiole and the abdomen formed as in the worker.

This insect is very rarely met with in this country, and may be considered one of our scarcest species of ants. Females have occasionally been taken on the wing, or, attracted by lights, have flown into apartments; but I do not know of any one discovering its formicarium. Mr. Westwood, I believe, first discovered the species in Britain, and several specimens were taken by the late Mr. Ingpen. Dr. Power discovered it at Brighton, and he has also taken it at Merton in Surrey. Although I have diligently searched after these insects for years, I never met with a single example. Mr. Janson found this insect in company with *Formica fuliginosa*.

Fam. 3. Myrmicidæ, Smith.

The number of joints in the labial and maxillary palpi differing in the species; eyes usually present in all the sexes; males and females furnished with ocelli, obsolete in the workers; the petiole of the abdomen with two nodes; the females and workers provided with a sting; the pupæ not enclosed in cocoons.

Genus 1. MYRMICA.

Formica, pt., *Linn. Syst. Nat.* i. 963 (1766).

Myrmica, *Latr. Gen. Crust. et Ins.* iv. 131 (1804).

The labial palpi four-jointed; the maxillary palpi six-jointed; the anterior wings with the nervure at the base of the marginal cell uniting with the transverse cubital nervure, crossed by a transverse nervure; antennæ clavate; the club three-jointed in the first division.

1. *Myrmica ruginodis*.

Fœmina.—Testaceo-ferruginea, sparse flavido-pilosa; capite supra, abdominis dorso medio, scutello et macula ventrali plus minusve fusciscentibus; scapo ad basin arcuatim flexo; capite thoraceque longitudinaliter striatim rugosis; metathoracis spinis longiusculis; alis hyalinis, nervis et stigmatibus subflavescentibus; nodis petioli rugosis.

Operaria.—Testaceo-ferruginea, sparse flavido-pilosula; capite supra abdominisque dorso medio fusciscentibus; scapo basin versus arcuatim flexo; capite thoraceque longitudinaliter striatim rugosis; metathoracis spinis binis validiusculis longis; nodis petioli rugosis.

Mas..—Nigro-fuscus, nitidus, flavide pilosulus; mandibulis, flagellis, articulis pedum et tarsis testaceo-pallescentibus; abdominis apice pallide rufescente.

Myrmica ruginodis, *Nyl. Adno. Mon. Form. Bor. Eur.* 929. 2;

Addit. Adno. p. 1052. 19; *Form. Fr. et d'Algér.* p. 79. 3.

Foerst. Hym. Stud. Form. p. 66. 36.

Schenck, Besch. Nass. Ameis. p. 77.

Smith, Brit. Form. p. 116. 2.

Mayr. Form. Austr. p. 135. 4.

Myrmica vagans, *Curtis, Trans. Linn. Soc.* xxi. 213. 3.

Female.—Length $2\frac{1}{2}$ –3 lines.—Rufo-testaceous, thinly sprinkled with yellow hairs; the posterior margin of the scutellum, and sometimes that of the prothorax, the head above, and the middle of the abdomen, fuscous; the scape of the antennæ bent, and slender at its base; the head and thorax longitudinally and coarsely striated; the nodes of the petiole rugose; the abdomen smooth and shining; the metathorax with two acute spines.

Worker. Length $2\frac{1}{2}$ lines.—Pale ferruginous, thinly sprinkled with yellow hairs; the head above and the abdomen in the middle fuscous; the head longitudinally striated; the thorax longitudinally rugose; the abdomen smooth and shining; the scape of the antennæ bent, and slender at its base; the metathorax armed with two long acute spines; the nodes of the petiole rugose.

Male. Length $2\frac{1}{2}$ –3 lines.—Dark blackish brown, smooth and shining; the mandibles, flagellum, the articulations of the legs, the tarsi, and tip of the abdomen, pale rufo-testaceous; the scape of the antennæ half the length of the flagellum.

Dr. Nylander says the male of this species is the *F. vagans* of the Museum at Kiel, and that its female represents the *F. rubra* of Fabricius, the male representing the *F. cæspitum*: which species is identical with the *F. rubra* of Linnæus, it is impossible to determine; but probably it was the same as the present species. Under these circumstances, we adopt the names given by Nylander, which avoids the possibility of error.

2. *Myrmica scabrinodis*.

Fæmina.—Testaceo-ferruginea, sparse flavido-pilosa; capite supra, scutello postice, abdominisque dorso medio fuscescens; scapo ad basin geniculatim flexo; capite, thorace et

nodis petioli longitudinaliter striatis, profunde rugosis; metathorace spinis longiusculis.

Operaria.—Similis fœminæ.

Mas.—Nigro-fuscus, nitidus, sparse flavido-pilosulus; mandibulis, pedum articulis tarsisque et abdominis apice pallide rufescentibus; antennis obscure rufescentibus, scapo longitudine quintæ partis totius antennæ.

Myrmica scabrinodis, *Nyl. Adno. Mon. Form. Bor. Eur.* 930. 3; *Addit. Adno. Mon. Form.* 1052. 20; *Form. Fr. et d'Algér.* p. 81. 6.

Foerst. Hym. Stud. Form. p. 67. 37.

Schenck, Besch. Nass. Ameis. p. 98.

Smith, Brit. Form. 115. 1.

Mayr. Form. Austr. p. 138. 6.

Myrmica cæspitum, *Zett. Ins. Lapp.* p. 450. 1 ♂.

Myrmica rubra, *Curtis, Trans. Linn. Soc.* xxi. p. 213. 1.

Female. Length $2\frac{1}{2}$ lines.—Pale ferruginous, with a thin yellowish pubescence; the head above, the mesothorax with a rounded spot anteriorly and a longitudinal stripe on each side, fuscous, sometimes black; the anterior spot on the mesothorax in some cases obsolete; the scape not attenuated at its base, but abruptly elbowed, forming an acute angular lobe; the head, thorax, and nodes of the petiole rugose-striate; the spines on the metathorax long and acute; wings hyaline, faintly smoky at their base, the nervures and stigma pale testaceous. Abdomen ovate, very smooth and shining, with a fuscous cloud in the middle, more or less dark in different individuals.

Worker. Length $1\frac{1}{2}$ –2 lines.—Very closely resembling the female; differing only in the usual sexual difference of the form of the thorax, which is narrowed posteriorly and slightly strangled between the meso- and metathorax; the antennæ formed as in the female.

Male. Length 2 – $2\frac{1}{2}$ lines.—Very closely resembling the male of the preceding species; but may be easily distinguished by the short scape of the antennæ, which is not more than one-fourth the length of the flagellum, and about half the length of the scape of the male of *ruginodis*.

The form of the antennæ alone serves to distinguish this very abundant insect from all its congeners. This ant is frequently met with occupying one side of a little hillock thrown up by *F. flava*. In some parts of the country it abounds to such an extent, that clouds, consisting of myriads of the winged males and

females, are often seen floating in the air, frequently taking the course of rivers; thousands of these winged ants may on such occasions be observed floating down the stream. On the hilly fields in Yorkshire I observed a colony of this, or the preceding species, under almost every stone, and amongst one of these colonies I detected a specimen of the rare *Batrisus venustus*.

3. *Myrmica lævinodis*.

Fœmina.—Testaceo-ferruginea, flavido-pilosula; capite supra, prothorace, scutello, abdominis medio fuscescentibus; scapo ad basin leviter arcuatim flexo; metathoracè subtransversim striato, spinis binis validiusculis; nodis petioli sublævibus.

Operaria.—Testaceo-ferruginea, sparse flavido-pilosula; capite supra abdominisque dorso fuscescentibus; capite et thorace longitudinaliter striatim rugulosis; metathorace spinis binis validiusculis; nodis petioli sublævibus.

Mas.—Nigro-fuscus, nitidus, flavido-pilosulus; mandibulis, flagellis apice, articulis pedum tarsisque testaceo-pallescentibus; metathorace inermi, tuberculis utrinque subobsoletis.

Myrmica lævinodis, *Nyl. Adno. Mon. Form. Bor. Eur.* 1052. 18;
Form. Fr. et d'Algér. 78. 2.

Foerst. Hym. Stud. Form. 64. 35.

Curtis, Trans. Linn. Soc. xxi. 213. 2.

Smith, Brit. Form. 118. 3.

Mayr. Form. Austr. 130. 2.

Female. Length $2\frac{1}{2}$ lines.—Pale ferruginous, with the head above, the prothorax slightly, the scutellum more or less, and the middle of the abdomen, fuscous; the head and thorax coarsely striated longitudinally; the spines on the metathorax short, stout and acute; the nodes of the petiole only slightly or indistinctly rugose.

Worker. Length $2-2\frac{1}{2}$ lines.—Only differs from the female in the usual sexual distinctions.

Male. Length 2 lines.—Dark fuscous, shining; the head subopaque, obsoletely rugose; mandibles pale testaceous; the antennæ and articulations of the legs pale rufo-testaceous; the metathorax with obtuse angles, not spined; wings hyaline.

This species most closely resembles *M. ruginodis*. The female has the thoracic spines shorter, and the smooth nodes of the

petiole will serve to distinguish this sex. The worker has the thorax less coarsely sculptured and the nodes smooth and shining, the sculpture delicate, and very different to *M. ruginodis*. The male has the antennæ shorter—intermediate between the two preceding species.

Not common in the London district, but plentiful in many localities; it is exceedingly abundant at Folkestone, Dover, and Deal, also at the back of the Isle of Wight.

4. *Myrmica sulcinodis*.

Fœmina.—Sordide rubida; capite supra fuscescente; mandibulis, antennis apice pedibusque pallide ferrugineis; capite, thorace et petiolo longitudinaliter striatis, profunde exaratis; abdomine fusco-nigro, nitido.

Operaria.—Sordide rubida; capite abdomineque fusco-nigrescentibus; mandibulis antennisque pallide rufescentibus; capite, thorace et petiolo longitudinaliter striatis, profunde exaratis; antennarum scapo ad basin parum curvato; metathorace spinis longis; area frontali striata.

Mas.—Nigro-fuscus, nitidus, parcissime tenuiter flavido-pilosulus; mandibulis, antennarum flagellis, articulis pedum tarsisque pallide rufo-testaceis; area frontali longitudinaliter striata; metathorace supra, nodis segmenti primi longitudinaliter striatim rugulosus.

Myrmica sulcinodis, *Nyl. Adno. Mon. Form. Bor. Eur.* p. 934;

Form. Fr. et d'Algér. p. 80. 5.

Smith, Brit. Form. p. 119. 4.

Mayr. Form. Austr. p. 136. 5.

Myrmica perelegans, *Curtis, Trans. Linn. Soc.* xxi. 214. 5.

Female. Length 3 lines.—Rufo-ferruginous; the head fuscous above; the abdomen shining black or dark fuscous; the head, thorax, and nodes of the abdomen rugose-striate, or rather sulcated; the frontal area striated; the scape slightly curved at the base; the mandibles sometimes yellowish; the spines of the metathorax long, acute, and curving slightly inwards; wings hyaline, the nervures and stigma pale rufo-testaceous.

Worker. Length 2-2½ lines.—Only differs from the female in the usual form of the thorax, which is more coarsely grooved; the spines of the metathorax are erect; usually darker in colour.

Male. Length $2\frac{1}{2}$ lines.—Dark fuscous, or nearly black; antennæ, ✓ abdomen at the apex, and the legs pale ferruginous; the head and thorax longitudinally rugose; the frontal area rugose-striate; the basal node of the petiole rugose, the second node as well as the abdomen smooth and shining.

This is a very local species: it has been captured by Mr. Dale in Wales, and by Mr. Curtis and Mr. Dossetor in Hampshire. I have received specimens from Dr. Nylander, Dr. Myer, and Mr. Curtis, and, after a careful comparison, I consider them without doubt to be all one species.

5. *Myrmica lobicornis*.

Fœmina.—Sordide rubra, sparse flavido-pilosula; capite supra, mesothorace partim, scutello posteriori abdominisque dorso medio fusciscentibus; mandibulis et pedibus rufo-testaceis; capite striato; thorace et petiolo longitudinaliter striatis, profunde rugosis; antennarum scapo ad basin geniculatim flexo, geniculo supra acute subdenticulato.

Operaria.—Obscure rubida, sparse flavido-pilosula; cætera ut in præcedente.

Mas.—Nigro-fuscus; mandibulis, antennis pedibusque pallide ferrugineis; thorace et petiolo sublævibus; antennarum scapo ad basin curvato.

Myrmica lobicornis, *Nyl. Adno. Mon. Form. Bor. Eur.* p. 932. 4; *Addit. Adno.* p. 1052. 21; *Addit. Alt.* p. 31; *Form. Fr. et d'Algér.* p. 82. 7.

Fœrat. Hym. Stud. Form. p. 69. 38.

Schenck, Besch. Nass. Ameis. p. 82.

Mayr. Form. Austr. p. 140. 7.

Smith, Cat. Form. p. 116. 8.

Myrmica denticornis, *Curtis, Trans. Linn. Soc.* xxi. 215. 7.

Smith, Brit. Form. p. 120. 5.

Female. Length $2\frac{1}{2}$ lines.—Ferruginous; the head above, the hinder portion of the mesothorax, the scutellum posteriorly, the mesosternum, and the abdomen above, fuscous, sometimes blackish; the abdomen very smooth and shining; the antennæ geniculated at their base, the angle of the geniculation produced into an acute tooth; the head longitudinally striated; the metathorax with two slightly divergent spines; the nodes of the petiole rugose.

Worker. Length 2 lines.—Closely resembling the female; the

antennæ geniculated, and produced at the elbow into an acute lobe or tooth.

Male. Length $2\frac{1}{2}$ lines.—Dark fuscous, sometimes obscure castaneous; the mandibles, apex of the scape, flagellum, articulations of the legs and the tarsi, pale testaceous; the antennæ slightly curved or subgeniculated at the base; the abdomen very smooth and shining. *

I have obtained specimens of the *M. lobicornis* of Nylander, and on comparison with others I am quite satisfied of their identity. I am not aware of any one having captured this species except Mr. Curtis, who found it in Scotland in the year 1825.

TETRAMORIUM, Mayr.

The maxillary palpi 4-jointed; the labial palpi 3-jointed; the anterior wings with one marginal, two submarginal, and one discoidal cell; the club of the antennæ 3-jointed.

6. *Myrmica* (Tetramorium) *cæspitum*.

Fœmina.—Fusco-nigra, nitida, flavido-pilosula; mandibulis, antennarum flagellis, articulis pedum tarsisque pallidis; capite, pleuris et metathorace longitudinaliter striatis, opacis; metathoracis spinis mediocribus validiusculis, obtusiusculis; alis hyalinis, stigmatibus dilutis.

Operaria.—Fusco-nigra, sparse pallide pilosula; mandibulis, antennis pedibusque articulis et tarsis rufo-pallescentibus; capite thoraceque subtiliter longitudinaliter rugulosis; spinis metathoracis minutis, dentiformibus; nodis petioli sublævibus.

Mas.—Niger, nitidiusculus; mandibulis, antennis pedibusque sordide pallescentibus; capite parvo, thorace subtiliter striatulis; antennis 10-articulatis; alis hyalinis, nervis pallescentibus, stigmatibus pallide fuscis.

Formica cæspitum, Linn. *Faun. Suec.* no. 1726; *Syst. Nat.* i. 963. 11 ♂.

Latr. Hist. Nat. Fourm. 251. t. 10. f. 63.

Formica binodis, Linn. *Amæn. Acad.* vi. 413. 94, type in Cab. Mus. Linn. Soc.

Myrmica fuscula, Nyl. *Adno. Mon. Form. Bor. Eur.* 935. 6; *Form. Fr. et d'Algér.* 86. 13.

Foerst. Hym. Stud. Form. 56. 29.

Scheuck, Beschr. Nass. Ameis. 86.

Myrmica impura, Foerst. *Hym. Stud. Form.* 48. 22 ♂.

Myrmica modesta, Foerst. *Hym. Stud. Form.* 49. 23 ♂.

Myrmica cæspitum, Latr. *Hist. Nat. Crust. et Ins.* xiii. 259.

Losana, *Form. Piem.* 327.

Curtis, *Trans. Linn. Soc.* xxi. 215. 8.

Smith, *Brit. Form.* 122.

Nyl. Form. Pr. et d'Algér. 86. 13.

Tetramorium cæspitum, Mayr, *Form. Austr.* 154. 2.

Female. Length $3\frac{1}{4}$ lines.—Shining black, or sometimes dark fuscous; head narrower than the thorax and longitudinally striated, subopake; the mandibles, antennæ, articulations of the legs and the tarsi pale ferruginous; the scape slightly fuscous above. Thorax somewhat flattened above, with the mesothorax longitudinally striated behind, and having on each side before the insertion of the wings a short impressed line; the metathorax longitudinally striated above in the middle of its base, and transversely so beyond; the spines short and acute; wings hyaline, the nervures pale, the stigma fuscous. Abdomen oblong-ovate, with the apical margins of the segments rufo-testaceous; the basal node of the petiole subovate, the second transverse.

Worker. Length $1\frac{1}{2}$ –2 lines.—Usually rather paler than the female; the head subrectangular, wider than the thorax, and longitudinally striated; the thorax also striated longitudinally; the metathoracic spines short, upright, and acute; the nodes of the petiole smooth, and of the same form as in the female; abdomen very smooth and shining, the apex usually more or less pale ferruginous.

Male. Length $2\frac{1}{2}$ –3 lines.—Shining black, with the abdomen usually more or less obscurely fusco-ferruginous; the antennæ, mandibles, articulations of the legs and the tarsi pale rufo-testaceous; the wings fusco-hyaline, the nervures pale testaceous, with the stigma darker. The head narrower than the thorax and finely rugose; the thorax longitudinally and finely striated, a smooth shining space in the middle, anteriorly with a similar smooth space on each side. Abdomen ovate, smooth, and shining; the nodes of the petiole finely rugose.

Although the antennæ are said to be 10-jointed, it will be found that the third joint is really composed of three joints of equal thickness, and as it were soldered together. This species is local, but very abundant on the coast in many places; it certainly prefers such situations to inland localities. It is plentiful in the Isle of Wight at Luccomb and Shanklin, also in Sandown Bay and at Ventnor; its colonies are large and numerous below

Southend, at Shoeburyness, also at Deal and Dover, and will probably be found along the whole line of the eastern and southern coasts.

7. *Myrmica* (*Tetramorium*) *lippula*.

Fæmina.—Rufo-pallida, sparse pilosula; capite et thorace supra longitudinaliter striatulis; alis totis albo-hyalinis; spinis metathoracis parvis, dentiformibus; nodis sublævibus, primo elongato, secundo globoso.

Operaria.—Ferruginea; abdomine dorso in medio fusco; capite et thorace reticulatis; oculis minutissimis; metathorace spinis duabus minutis acutis; nodo primo elongato.

Myrmica graminicola, *Latr. Hist. Nat. Fourm.* p. 256 ♀ (nec worker).

Smith, Brit. Form. p. 126. 9.

Curtis, Trans. Linn. Soc. xxi. 216. 11.

Myrmica lippula, *Nyl. Addit. Alt. Form. Bor. Eur.* 41. 8; *Form. Fr. et d'Algér.* p. 88. 15.

Myrmica Minkii, *Foerst. Hym. Stud. Form.* p. 63. 33.

Schenck, Besch. Nass. Ameis. p. 142.

Mayr, Form. Austr. p. 143.

Female. Length 2-2½ lines.—Pale ferruginous; the head and thorax reticulated, the reticulation inclining to striation on the head; the eyes small and black; the metathorax transversely striated at the base, the spines short and acute; the wings hyaline, the nervures and stigma pale testaceous; the first node of the petiole elongate, or petiolated, the second smooth and globose; the abdomen oblong-ovate.

Worker. Length 1½ line.—Rufo-fuscous, sometimes nigro-fuscous; the head anteriorly, the mandibles, antennæ, legs, and abdomen beneath, pale rufo-testaceous, sculptured like the female; the spines on the metathorax small and acute; the first node petiolated, as in the other sex; abdomen ovate, smooth, shining and pale at the base and apex; the eyes very small.

I have not seen the male of this species. Latreille describes it as being "dark fuscous, or black, shining and pubescent; the flagellum ferruginous, the scape fuscous; the metathorax with two little acute tubercles; the tarsi pale, the wings very dark."

I think it quite possible that the worker described by Latreille is a variety of *M. acervorum*—in this I agree with Dr. Nylander; and I am satisfied that the female is that of the present species; but as two, if not three, distinct species are described under the

name "*graminicola*," I think it right to adopt Nylander's name. I have never found a colony of this species—all my examples, eight in number, have been picked up singly. The late Mr. Wing gave me a winged female which he took in his garden at Lambeth. I have taken it on the wing in the month of September. A single specimen of the worker was taken at Plymouth by Mr. Reading. The male is not known: Dr. Nylander only describes the *worker*, Dr. Mayr the *worker* and *female*. Mr. Janson found this species in company with *Formica fuliginosa*.

LEPTOTHORAX, Mayr.

The maxillary palpi 5-jointed; the labial palpi 3-jointed; the female and worker of nearly the same size; the pubescence on the body above has the hairs clavate, narrowed at their base; the club of the flagellum 3-jointed.

8. *Myrmica* (*Leptothorax*) *acervorum*.

Fœmina.—Sordida, pallide rubida, sparse pilosula; capite, thorace abdomineque supra fusco-nigricantibus; capite longitudinaliter striatulo; alis albo-hyalinis, nervis et stigmatibus pallidis; spinis metathoracis mediocribus.

Operaria.—Sordide rubra, sparse pilosula; capite abdomineque supra fusciscentibus; capite longitudinaliter striatulo; thorace nodisque petioli rugoso-scabriusculis.

Mas.—Niger, nitidiusculus; tibiarum basi apiceque tarsisque pallidis; metathoracis apice polito, utrinque angulatim tuberculato; alis lacteo-hyalinis.

Formica acervorum, *Fabr. Ent. Syst.* ii. 358. 38; *Syst. Piez.* p. 407. 50.

Myrmica acervorum, *Zett. Ins. Lapp.* p. 451. 3.

Nyl. Adno. Mon. Form. Bor. Eur. p. 936. 7; *Addit. Adno.* p. 1057;

Form. Fr. et d'Algér. p. 89. 16.

Foerst. Hym. Stud. Form. p. 61. 32.

Schenck, Besch. Nass. Ameis. p. 97.

Smith, Brit. Form. p. 124. 8.

Leptothorax acervorum, *Mayr, Form. Austr.* p. 164. 1.

Myrmica lacteipennis, *Zett. Ins. Lapp.* p. 452. 5 ♂.

Myrmica graminicola, *Latr. Hist. Nat. Fourm.* p. 255 ♀, nec ♀ et ♂.

Female. Length $1\frac{3}{4}$ line.—Rufous; the head, thorax, and abdomen above, fuscous, nearly black; the club of the antennæ and the middle of the femora fuscous; the mandibles, base of

the flagellum, the scape, and the tibiæ and tarsi, pale ferruginous; the head and thorax finely striated longitudinally; the metathorax with two short stoutish spines; the nodes of the petiole rugose above; the legs and abdomen sprinkled with a few short glittering hairs.

Worker. Length $1\frac{1}{2}$ line.—Rufous; the club of the antennæ, the head above, and the disk of the thorax, more or less fuscous; the head longitudinally striated; the thorax and nodes of the petiole rugose; the femora more or less dusky in the middle; the abdomen smooth and shining, and, as well as the legs, sprinkled with glittering hairs.

Male. Length $1\frac{3}{4}$ –2 lines.—Black; the articulations of the legs and the tarsi pale testaceous; the head pubescent, and, as well as the thorax, slightly shining; the abdomen very smooth and shining; the wings milky-white.

This species is not frequently met with in the vicinity of London. I have found its colonies under bark: all the sexes were of a lighter colour than is usual. In Scotland, as I have been informed by a working collector, it is commonly found beneath the bark of fir-stumps.

9. *Myrmica* (*Leptothorax*) *Nylanderi*.

Fœmina.—Rufo-pallida; abdominis fascia lata fusca; capite et mesothorace subtiliter longitudinaliter striatis; alis hyalinis, nervis pallidis subobsoletis.

Operaria.—Rufo-pallida; capite abdomineque (basi excepto) fusciscentibus; capite longitudinaliter striato; thorace nodisque subtiliter rugoso-scabriusculis; area frontali nitidiuscula; spinis metathoracis mediocribus acutiusculis.

Mas.—Fusco-niger, nitidus; mandibulis, antennis pedibusque pallide testaceis; alis lacteo-hyalinis.

Myrmica Nylanderi, *Foerst. Hym. Stud. Form.* p. 53 ♂ (1850).

Myrmica cingulata, *Schenck, Nass. Ameis.* p. 104 (1852).

Nyl. Form. Fr. et d'Algér. p. 93. 20.

Myrmica unifasciata, *Smith, Brit. Form.* p. 128.

Curtis, Trans. Linn. Soc. xxi. 216. 12.

Stenamma albipennis, *Curtis, Trans. Linn. Soc.* xxi. p. 218. 15 ♂.

Myrmica parvula, *Schenck, Nass. Ameis.* pp. 103, 140?

Mayr, Form. Austr. p. 176. 12 ♀ ♀.

Leptothorax Nylanderi, *Mayr, Form. Austr.* p. 176. 11 ♀ ♀.

Female. Length $1\frac{1}{4}$ –2 lines.—Pale ferruginous, yellowish; the head above slightly fuscous; the abdomen with a broad fuscous

fascia on the first segment, the apical margins of the two following with narrow fuscous margins; sometimes a slight fuscous stain on each side of the mesothorax, and also the hinder margin of the scutellum fuscous; the wings colourless; the head and thorax delicately striated; the metathorax with two acute spines.

Worker. Length 1 line.—Pale reddish yellow; the head and abdomen fuscous, the latter at the extreme base and apex pale.

Male. Length $1\frac{1}{4}$ line.—Dark fuscous, nearly black; the mandibles, antennæ and legs pale rufo-testaceous; the thorax, nodes of the petiole, and the abdomen smooth and shining.

The *unifasciata* of British collections is not that which continental Hymenopterists consider to be Latreille's species; in one respect it does not quite agree: the female has, in fact, three bands on the abdomen, and the worker has the abdomen nearly entirely fuscous, only the base and apex pale; it cannot be said to have "une bande noire transverse sur le bord postérieure du premier segment." The *unifasciata* has the club of the antennæ fuscous, and a narrow fuscous band on the apical margin of the first segment. I have not seen a British specimen.

10. *Myrmica* (*Leptothorax*) *simillima*.

Operaria.—Rufo-pallida; abdomine fuscescente, basi pallido; capite longitudinaliter striatim ruguloso; metathorace spinis parvis acutis dentiformibus.

Myrmica simillima, *Nyl. Form. Fr. et d'Algér.* p. 94.

Smith, Brit. Hym. 118; *Cat. Hym. Ins.* pt. 6. *Form.* 119

Brit. Form. p. 129.

Leptothorax affinis, *Mayr, Form. Austr.* p. 170. 7?

Worker. Length $\frac{3}{4}$ line.—Head, thorax, and nodes of the peduncle rufo-testaceous; the mandibles, flagellum and legs pale flavo-testaceous. Abdomen rufo-fuscous, shining, and pale at the base and apex. Thorax rugose-striate, the anterior margin transverse, the angles acute; the thorax continuous, not strangled between the meso- and metathorax, the spines short and acute; the metathorax truncate; the nodes of the petiole finely rugose. The insect is thinly sprinkled with short erect pale hairs, most apparent at the apex of the abdomen.

This species was sent to me by Mr. Dale, who took it at Glanville's Wootton, Dorset. I believe it was found in a greenhouse. I have received it since from Exeter, taken in a similar

situation. It may be an imported species, but I have not seen any foreign examples.

STENAMMA, *Westw.*

The maxillary palpi 4-jointed; the labial palpi 3-jointed; mandibles dentate; the second node of the petiole spined in front beneath; the club of the antennæ 3-jointed; the anterior wings with the marginal cell open, one complete submarginal, and one discoidal cell.

11. *Myrmica* (*Stenamma*) *Westwoodii*.

Fæmina.—Sordide rufa, lævis, nitidissima; capite supra et thorace dorso fuscescentibus; abdomine fusco-nigro; spinis metathoracis brevibus.

Operaria.—Rufa, lævis, nitidissima; abdomine basi (apice excepto) fusco-nigro; metathorace spinis duabus horizontalibus validiusculis.

Mas.—Nigro-fuscus, sparse pilosulus; mandibulis, antennis pedibusque pallescentibus; metathorace spinis duabus brevibus; alis hyalinis.

Stenamma Westwoodii, *Steph. Westw. Intr. Class. Ins.* ii. 226. t.86. f. 11 ♂.

Myrmica nitidula, *Nyl. Addit. Adno. Mon. Form. Bor. Eur.* p.1058; *Addit. Att.* p. 34; *Form. Fr. et d'Algér.* p. 94. 22.

Foerst. Hym. Stud. Form. p. 55. 28 ♀.

Myrmica læviuscula, *Foerst. Hym. Stud. Form.* p. 54. 27 ♀.

Myrmica debilis, *Foerst. Hym. Stud. Form.* p. 52. 25 ♂.

Formicoxenus nitidulus, *Mayr, Form. Austr.* 146. 1.

Female. Length 2 lines.—Rufous, sometimes pale red, very smooth and shining; head, thorax, and middle of the abdomen more or less fuscous; the head delicately striated longitudinally; the metathorax with two short acute spines; the wings hyaline; the second node of the petiole spined beneath.

Worker. Length $1\frac{1}{2}$ line.—Pale rufous, smooth and shining; the head slightly fuscous above, frequently of one uniform colour; the metathorax with a smooth central depression, on each side of which is a stout horizontal tooth; abdomen sometimes nigro-piceous in the middle; the first node of the petiole with a cariniform process beneath, the second node with a stout spine at its base directed forwards.

Male. Length 2 lines.—Nigro-fuscous; the mandibles triden-

tate; antennæ 13-jointed; the legs pale, with the femora more or less fuscous; the metathorax with two short erect teeth; the wings milky-white. The insect sprinkled with thin pubescence.

I have long suspected *Stenamma* to be a male of some small species of *Myrmica*. Nylander, who has carefully examined the *Stenamma* in the collection of the British Museum, says it is the male of *M. nitidula*; such being the case, it is only common justice to restore Westwood's name to this species, and *Stenamma* should be used as the subgeneric name, having the priority of *Formicoxenus*. This species is found in the nests of *Formica rufa* and *F. congerens*; it has never been observed in any other situation. The worker was first discovered in this country by Mr. G. R. Waterhouse, since which, others have met with it when searching for Myrmecophilous Coleoptera.

DIPLORHOPTRUM, Mayr.

The workers very minute; the labial palpi 2-jointed; the maxillary palpi 2-jointed; antennæ of the workers 10-jointed, the club 2-jointed; antennæ of the male 12-jointed; anterior wing with one marginal, one submarginal, and one discoidal cell.

12. *Myrmica* (*Diplorhoptrum*) *fugax*.

Femina.—Fusco-nigricans, tenuiter pilosula; mandibulis, antennis pedibusque pallide rufescentibus; clypeo margine bidentato.

Operaria.—Pallide flavescens, lævis, nitida; antennarum clava flagelli biarticulata; metathorace declivi, mutico; pedibus pallescentibus; abdomine medio supra subfasciatim fuscescente.

Mas.—Niger, nitidus, tenuiter pilosulus; antennis pedibusque fuscis; mandibulis tarsisque pallescentibus.

Formica fugax, Latr. *Hist. Nat. Fourm.* p. 265.

Schill. *Bemerk. üb. die in Schles. &c.* p. 56.

Myrmica fugax, St. Farg. *Hym.* i. 184.

Schenck, *Beschr. Nass. Ameis.* p. 107.

Smith, *Brit. Form.* p. 127. 10.

Nyl. *Form. Fr. et d'Algér.* p. 99.

Myrmica flavidula, Nyl. *Addit. Adno. Mon. Form. Bor. Eur.* p. 33.

Diplorhoptrum fugax, Mayr, *Form. Austr.* 178. 1.

Female. Length $2\frac{1}{2}$ lines.—Dark fuscous, thinly pubescent and shining; the mandibles, antennæ and legs pale ferruginous;

the head finely punctured; the anterior margin of the clypeus bidentate. Thorax subovate; wings clear hyaline, the stigma pale brown.

Worker. Length $\frac{3}{4}$ -1 line.—Pale yellow, with the head and disk of the thorax rather darker; the abdomen with an obscure fuscous fascia; the club of the antennæ 2-jointed. Thorax slightly strangled between the meso- and metathorax, the latter oblique, not spined; the first node of the petiole oblong, somewhat pear-shaped, the second globose; abdomen ovate, smooth and shining.

Male. Length 2 lines.—Shining black and slightly pilose; the antennæ and the legs fuscous; the mandibles and tarsi pale testaceous.

This species is very local; the only places where it has been taken, to my knowledge, are Southend and Deal. It appears to prefer trodden pathways to burrow in. The sexes are to be found in the nests in the month of September.

13. *Myrmica (Diplorhoptrum) molesta.*

Fœmina.—Pallide testacea; thoracis macula antica, scutello abdomineque fusco-nigris, basi solum pallido; clava flagelli tri-articulata; metathorace mutico.

Operaria.—Pallide flavo-testacea, lævis, opaca; abdomine nitido, apice fuscescente; metathorace mutico.

Mas.—Fusco-niger, nitidus; antennis pedibusque pallide testaceis, antennis 13-articulatis; alis albo-hyalinis.

Myrmica molesta, Say, *Bost. Journ. Nat. Hist.* i. 293. 6 (1834).

Myrmica domestica, Shuck. *Mag. Nat. Hist.* p. 628 (1838).

Daniells, *Proc. Linn. Soc.* ii. 172.

Smith, *Brit. Form.* p. 130. 14.

Curtis, *Trans. Linn. Soc.* xxi. 217. 13.

Nyl. Form. Fr. et d'Algér. 98. 26.

Female. Length $1\frac{1}{2}$ line.—Pale rufo-testaceous; the antennæ 12-jointed; a minute black stain behind the anterior ocellus, and another within each of the posterior ones. Thorax elongate-ovate; a slight longitudinal stain on the mesothorax anteriorly, and a smaller one on the sides; the posterior margin of the scutellum fuscous. Abdomen dark fuscous, with the base pale rufo-testaceous; the apical margins of the following segments narrowly testaceous.

Worker. Length $\frac{3}{4}$ line.—Pale reddish yellow, naked, smooth

and opaque; the apex and sides of the abdomen more or less fuscous; the metathorax not spined; the thorax is slightly strangulated between the meso- and the metathorax; the abdomen smooth and shining.

Male.—Nigro-fuscous and subopaque; the abdomen shining; the flagellum and legs pale testaceous; the scape more or less fuscous; the antennæ with short pubescence; the thorax very closely and delicately punctured; the scutellum convex; the wings hyaline; the nervures pale testaceous.

I have no doubt of this ant having been imported in merchandise; it is the *Myrmica molesta* of Say: I have carefully compared British specimens with others brought from North America by Edward Doubleday, from Dr. Harris, and I find them to be undoubtedly the same species. The Rev. Hamlet Clark brought it from Rio Janeiro, and describes it as being very annoying: he found it everywhere—indoors, out of doors, and upon everything. In this country it is not found except in houses, where it sometimes becomes so numerous as to be very annoying; it first appears to have attracted attention from that circumstance in 1828, since which it has spread widely over the metropolis. It cannot be considered indigenous, but will, I expect, remain with us, like the *Blatta orientalis*.

PHEIDOLE, Westw.

Pheidole, *Westw. Ann. & Mag. Nat. Hist.* vi. 87 (1841).

Myrmica, pt., *Nyl. Addit. Alt. Mon. Form. Bor. Eur.* p. 42.

Ecophthora, *Heer, Ueber die Hausameise Madeira's* (1852).

Labial palpi 2-jointed; maxillary palpi 2-jointed; club of the antennæ 3-jointed; worker major with the head very large, of moderate size in the small worker; antennæ 12-jointed in the workers and female; wings with two submarginal cells and one discoidal cell.

14. *Myrmica* (*Pheidole*) *lævigata*.

Operaria.—Rufo-testacea, lævis, tota nitidissima, nuda; mandibulis, antennis, pedum articulis tarsisque pallescentibus; nodo primo angusto; metathoracis spinis minutissimis.

Myrmica pallidula, *Nyl. Addit. Alt. Mon. Form. Bor.* p. 42?

Ecophthora pallidula, *Mayr, Form. Austr.* p. 183?

Myrmica lævigata, *Smith, Mon. Brit. Form.* p. 130.

Worker.—Rufo-testaceous; the mandibles, antennæ, articula-

tions of the legs, and the tarsi pale testaceous; head highly polished, smooth and shining. Thorax smooth and shining; the prothorax forming a neck, being narrowed towards the head; the metathorax truncate and very delicately reticulated; the spines very minute. Abdomen ovate, smooth and shining; the nodes of the petiole smooth; the first node petiolated, the second widest, and globose.

I believe this insect to be identical with the *Æcophthora pusilla* of Heer—the House-ant of Madeira. I have compared it very carefully with a series of the ant collected by T. V. Wollaston, Esq. in Madeira, and cannot detect any difference; it doubtless is an importation. Specimens have been forwarded to me from Exeter, taken in a hot-house; a solitary example was taken some years ago on a wall at Battersea, since which time I found three specimens on a garden wall at Hampstead. I am very much inclined to think that it is the same species described by Dr. Nylander as *Myrmica pallidula*, and it may also be the *Æcophthora subdentata* of Dr. Mayr. The species is described here, as in all probability it will in the course of time become generally distributed and naturalized, like the *Myrmica molesta*, our common house-ant.

Genus 2. MYRMECINA.

Myrmecina, *Curtis, Brit. Ent. vi. fol. 226 (1829).*

Myrmica, pt., *Nyl. Addit. Alt. Adno. Mon. Form. Bor. Eur. p. 40 (1847).*

Antennæ 12-jointed in the female, the club 3-jointed. Maxillary palpi 4-jointed; the labial palpi 3-jointed. Anterior wings with one complete marginal cell, appendiculated at the apex, and one complete submarginal cell. The metathorax spined in the females and workers, the clypeus bidentate. The mandibles obsolete or subobsolete in the males.

1. *Myrmecina Latreillii*.

Fœmina.—Nigra, sparse pilosula; capite antice, mandibulis, antennis, metathorace postice pedibusque rufo-pallidis; capite striato-ruguloso; thorace supra longitudinaliter profunde striato; alis fusco-brunneis.

Operaria.—Nigra; ore, antennis pedibusque rufis; capite, thorace nodisque petioli longitudinaliter striatis.

Mas.—Fusco-niger; ocellis prominulis; flagellis pallide rufo-

testaceis; scapo brevi, crassiusculo, fusco; pedibus testaceo-rufis; alis fusco-brunneis.

Myrmecina Latreillii, *Curtis, Brit. Ent.* vi. 265 ♂; *Trans. Linn. Soc.* xxi. 218. 16. t. 23. f. 22 ♀.

Smith, Brit. Form. 132. 1 ♀ ♂.

Mayr, Form. Austr. p. 149. 1 ♂ ♀.

Myrmica striatula, *Nyl. Addit. Alt. Mon. Form. Bor. Eur.* p. 40. 7.

Myrmica bidens, *Foerst. Hym. Stud. Form.* p. 50. 24 ♀ ♂.

Schenck, Besch. Nass. Ameis. p. 94.

Myrmica graminicola, *Foerst. Hym. Stud. Form.* p. 58. 30 ♂.

Female. Length $1\frac{1}{2}$ line.—Black; the head anteriorly, the antennæ, mandibles, legs, thorax beneath, metathorax, and nodes of the petiole, rufo-testaceous; the scape stout, and elbowed at the base; the club of the antennæ 3-jointed; the mandibles denticulate on their inner margin; the clypeus bidentate; the head longitudinally rugose-striate. Thorax smaller than the head, longitudinally rugose-striate; the scutellum smooth and shining; the metathoracic spines stout and acute; the wings fuscous, their margins ciliated. Abdomen smooth and shining, with thin scattered glittering pubescence.

Worker. Length $1\frac{1}{2}$ line.—Black; the head anteriorly, the antennæ and legs rufous; the head and thorax longitudinally striated; the clypeus bidentate; the metathorax with two stout horizontal spines.

Male. Length $1\frac{1}{2}$ line.—Pitchy-black, smooth and shining, thinly pubescent; the mouth, flagellum and legs pale rufo-testaceous; the antennæ pubescent; the scutellum smooth and shining, the sides striated; the metathorax deeply excavated in the middle, obliquely striated on each side; the wings fuscous, their margins ciliated. Abdomen oblong-ovate, with a thinly scattered pubescence; the nodes of the petiole finely rugose.

This species was discovered by Mr. Curtis in 1829, near Black Gang Chine in the Isle of Wight; at that time Mr. Curtis had only captured males. The genus was established in 1829, in the sixth volume of 'British Entomology,' accompanied by a beautiful figure, forming one of a series of entomological illustrations which cannot be surpassed in their beauty and accuracy. I have taken two males and two females, one of each in the vicinity of London, but up to the present time no one has discovered the workers. I also took a male and female at Luccomb Chine. The societies of *Myrmecina* must, I suspect, be very small, and their habits somewhat different from the majority of the *Myrmicidæ*, as they are so seldom seen, and those sexes only which are usually the most rarely met with.

Fam. 4. Mutillidæ, *Leach*.

(SOLITARY ANTS.)

The species of which this family is composed are solitary ; they consist of two sexes, male and female ; the males always winged, the females apterous ; the legs of the females stout, and fitted for burrowing ; the tibiæ spinose ; the tarsi ciliated ; the antennæ filiform or setaceous ; the apical segment of the abdomen of the males usually furnished with teeth or spines.

Genus 1. MUTILLA, *Linn*.

Head suborbiculate in the female, transverse and compressed in the males ; eyes small and round in the female, usually more or less emarginate in the males, but in some species they are ovate or round ; the stemmata three in a triangle placed on the vertex in the male, but wanting in the female ; the antennæ subfiliform, gradually tapering to their apex, which is acuminate, inserted on the sides of the base of the clypeus ; the mandibles arcuate, and usually unidentate in the female and tridentate in the male, but varying occasionally in this respect ; the thorax longitudinal in the female, and truncated usually at both extremities, in some exotic species much narrowed posteriorly ; the prothorax in the male extending laterally to the origin of the wings, the tegulæ usually very large ; *the anterior wings with one marginal and three submarginal cells, the marginal one usually of a nearly semicircular shape ; the three submarginal cells subequal, the second and third each receiving a recurrent nervure, the second nervure being almost obsolete, as well as the third transversocubital nervure, from the middle of which emanates a more or less abbreviated nervure, never extending to the apex of the wing ;* in a few exotic species the third submarginal cell is obsolete ; the legs moderately long and pubescent in the male, more robust and spinose in the female. Abdomen ovate, the first segment subpyriform, sometimes petiolate, the second subcampanulate, and the apex curved in the male.

The genus *Mutilla* is probably the most extensive in the entire group of the Aculeata—the Catalogue of the Fossiles, published by the British Museum; enumerates 313 species ; they are scattered universally : not only are they found in all the quarters

of the globe, but they are met with in all countries from the torrid to the frigid zones; *Mutilla frigida* was brought by Sir John Richardson from the Great Bear Lake in Arctic America.

Of the habits of the typical species, M. Drewsen of Copenhagen gives the following account*. From a nest of *Bombus Scrimshiranus* he obtained only two worker bees, but as many as seventy-six of *Mutilla Europæa*—forty-four males and thirty-two females. The larvæ of the *Mutilla* were found in the cells, closed in as usual by the full-fed grub of the bee: this appears to prove that the genus *Mutilla* is parasitic, and that it is carnivorous in the larva state, for the cells contained the full-grown grub of the parasite only.

Christius also mentions the fact of the larvæ of *Mutilla* being found in the nests of Humble-bees. Such being the habit of this extensive genus, it is proved that their attacks cannot be confined to Humble-bees. These insects are not found either in Australia or in tropical Africa, yet *Mutilla* is plentiful in both; in Brazil the *Mutillidæ* abound, but *Bombus* appears to be only sparingly distributed. In this country the species of *Mutilla* are scarce; and it appears strange that no one should have met with them in the nests of Humble-bees, which have been so frequently examined.

Amongst the numerous species of this genus, particularly those of South America, repeated instances occur of a wide divergence from the typical species: many of the males have the eyes large, very prominent, and ovate; others present remarkable differences in the form of the cells of the anterior wings, and would perhaps conveniently form types for subgeneric divisions; the males of many Brazilian species appear to have simple eyes—at least they exhibit no traces of reticulation when examined under a glass of considerable magnifying power.

1. *Mutilla Europæa*.

Fœmina.—Nigra; thorace rufo; abdomine fasciis tribus albis, duabus posticis interruptis.

Mas.—Chalybeus; thorace rufo; abdomine fasciis tribus albis subinterruptis.

Mutilla Europæa, Linn. Faun. Suec. no. 1727; Syst. Nat. i. 966.

4 ♀.

Sulz. Gesch. Ins. t. 27. f. 23 ♂, 24 ♀.

Schrank, Ins. Austr. p. 415. 839.

* See Journal of Ent. Soc. of Stettin, 1847, p. 210.

Mutilla Europaea, *Oliv. Enc. Méth.* viii. 57. 15.

Rossi, Faun. Etrus. ii. 114. 939.

Christ. Hym. 147. t. 11. f. 1 ♂, 2 ♀.

Don. Brit. Ins. vi. 77. t. 212.

Fabr. Ent. Syst. ii. 368. 9; *Syst. Piez.* 430. 11.

Latr. Act. Soc. Hist. Nat. i. 7. 2 ♂ ♀; *Hist. Nat. Ins.* xiii. 263.

Panz. Faun. Germ. 76. 20 ♂.

Shuck. Foss. Hym. 29. 1.

St. Farg. Hym. iii. 597. 3.

Baer, Bull. Mosc. xxi. 229. 2.

Nyland. Ap. Boreal. 8. 1.

Mutilla Panzeri, *St. Farg. Hym.* iii. 602. 11 ♂.

Female. Length 5-8 lines.—Head black, coarsely punctured, and with a scattered black pubescence; the mandibles rufescent at their apex; the thorax ferruginous; the prothorax black; the disk shining and strongly punctured; the legs black, very spinose and hairy. Abdomen black, shining and punctured; a broad subinterrupted band of glittering pale yellow hair on the first, second and third segments, the two latter interrupted; between the bands thinly clothed with erect black pubescence.

Male. Length 5-6 lines.—Chalybeous; the sides of the thorax obscure, as well as the truncation of the metathorax; the mesothorax, scutellum, post-scutellum and base of the metathorax red; the wings fuscous, darkest towards their apical margins; the basal segment of the abdomen with a band of glittering pale pubescence like the female, the bands on the second and third segments subinterrupted.

This species is widely but sparingly distributed; it has been found most abundantly in the sandy lanes of Kent; it is frequently taken about Darenth and Birch Woods; at the latter locality the male was taken as late as the 13th of September; it is by no means a rare insect in Hampshire.

2. *Mutilla calva*.

Fæmina.—Nigra; vertice thoraceque rufis; abdominis margine cinereo.

Mas.—Hirtus, niger; abdominis segmentis margine ciliatis.

Mutilla calva, *Villers, Ent.* iii. 343. 9. t. 8. f. 34 ♀.

Fabr. Ent. Syst. Supp. 282. 24; *Syst. Piez.* 438. 46.

Latr. Act. Soc. Hist. Nat. i. 10. 8 ♂ ♀.

Oliv. Encycl. Méth. viii. 64. 56.

Coqueb. Illus. Icon. Ins. dec. ii. t. 16. f. 10.

Mutilla calva, Shuck. Foss. Hym. 30. 2.

St. Farg. Hym. iii. 607. 19.

Nyland. Ap. Boreal. 11. 3.

Baer, Bull. Mosc. xxi. 230. 4.

Wesm. Hym. Foss. Belg. 18. 6.

Mutilla nigrita, Panz. Faun. Germ. 80. 22 ♂.

Fabr. Syst. Piez. 437. 40.

Oliv. Encycl. Méth. viii. 65. 59.

St. Farg. Hym. iii. 599. 6.

Female. Length 3-4 lines.—Head black, pilose, with the vertex and occiput fulvous; antennæ dark fulvous; mandibles fulvous, their tips black. Thorax fulvous, punctured, with a few scattered black hairs; legs rufous or rufo-fuscous. Abdomen black, the base fulvous, and armed on each side beneath with a fulvous tooth, which is bent obliquely downwards; the margins of the second and following segments thinly ciliated with white hairs.

Male. Length 3 lines.—Black; the head deeply punctured and pubescent; the mandibles piceous, more or less red in the middle. Thorax punctured, shining, and covered with a dense griseous pubescence; the metathorax rugose, with a smooth space at its base of the form of an isosceles triangle, with the sides a little rounded, and enclosed by an elevated ridge; the tegulæ piceous; wings fuscous, their nervures rufo-piceous. Abdomen with scattered punctures, shining, and covered with long griseous pubescence; the second and third segments have a band of short grey pubescence on their apical margins.

The claim of this insect to being indigenous is very doubtful; it is said to have been taken at Shooter's Hill; but, unless confirmed by future captures, its being a British species requires confirmation.

3. *Mutilla ephippium*.

Fæmina.—Nigra; antennis, thorace pedibusque rufis; abdomine puncto fasciisque duabus approximatis albis.

Mas.—Niger; thoracis dorso rufo.

Mutilla ephippium, Fabr. Ent. Syst. ii. 370. 18 ♂

Rossi, Faun. Etrus. Mant. i. t. 2. f. n ♀.

Oliv. Encycl. Méth. viii. 63. 45.

Curtis, Brit. Ent. ii. t. 77 ♂ ♀.

Shuck. Foss. Hym. 31. 3.

St. Farg. Hym. iii. 608. 22.

Nyland. Ap. Boreal. 13. 4.

Baer, Bull. Mosc. xxi. 229.

Mutilla rufipes, *Fabr. Ent. Syst.* ii. 372. 26 ♀.

Latr. Act. Soc. Hist. Nat. i. 9. 6.

Olin. Encycl. Méth. viii. 66. 68.

Coqueb. Illus. Icon. Ins. t. 16. f. 9.

St. Farg. Hym. iii. 612. 28.

Wesm. Hym. Foss. Belg. 7. 1.

Mutilla sellata, *Panz. Faun. Germ.* 46. 19 ♀.

Female. Length 2-3 lines.—Black; the head and thorax coarsely punctured; antennæ ferruginous, with six or seven of the apical joints black; the mandibles ferruginous, their tips black. Thorax and legs ferruginous, with long scattered pubescence. Abdomen punctured, with a thin scattered erect pubescence; a patch of silvery pubescence at the base of the second segment in the middle, and a fascia of similar pubescence on its apical margin; the third segment covered with silvery pubescence; the apical segment rufo-piceous; the general pubescence griseous.

Male. Length 2½-5 lines.—Black; strongly punctured; the collar, mesothorax, scutellum and tegulæ ferruginous; the wings fusco-hyaline, with a darker shade at their apical margins, the nervures testaceous; the apical margins of the second and two following segments ciliated with silvery hairs.

Var. β . Entirely black; the abdomen ciliated as above.

This species is abundant in some localities—on Plumstead Common, at Charlton near Greenwich, and at Weybridge; but I found it most numerous in Sandown Bay, Isle of Wight, where, in the middle of July 1851, both sexes were captured; amongst these, a specimen of the male, 5 lines in length, occurred, and also the very rare black variety. This species is also plentiful beyond Southend, where many specimens were captured running on the footpath at the top of the heights; it is also found on Deal sands, and on the slopes under the cliffs towards St. Margaret's Bay.

Genus 2. MYRMOSA.

Mutilla, pt., *Fabr. Ent. Syst.* ii. 366 (1793).

Myrmosa, *Latr. Hist. Nat.* xiii. (1805).

Head subglobose; stemmata in a triangle on the vertex; eyes small, round, and lateral; antennæ subfiliform, inserted, in the female, at each side of the base of the clypeus and approximate, in the male they are wider apart; the clypeus triangular

and longitudinally carinated in the female, in the male transverse and plane; mandibles unidentate and acuminate in the female, large and tridentate in the male; the thorax longitudinally quadrangular, the angles in front rounded; the metathorax truncated in the female; the thorax ovate in the male; the collar transverse, curving towards the base of the wings posteriorly, not reaching them; *the anterior wings with one marginal and four submarginal cells, the second submarginal triangular, receiving the first recurrent nervure near its centre; the third quadrate, receiving the second recurrent nervure at about one-third of its length, the fourth extending to the apex of the wing*; the legs spinose. Abdomen of the female ovato-conic, the first segment somewhat narrower than the second; the abdomen of the male oblong, the margins of the segments crenate, the last concave above and tridentate at its apex, which is truncated.

Only three or four species of this genus are known; the type, *M. melanocephala*, is the only one found in Britain. Of the habits of the species we are ignorant: they are tolerably abundant in sandy situations, and are widely distributed.

1. *Myrmosa melanocephala*.

Fæmina.—Rufa; capite abdominisque apice nigris.

Mas.—Totus niger.

Mutilla melanocephala, *Fabr. Ent. Syst.* ii. 372. 27 ♀.

Oliv. Encycl. Méth. viii. 65.

Coqueb. Illus. i. t. 6. f. 11.

Myrmosa melanocephala, *Latr. Hist. Nat.* xiii. 266; *Gen. Crust. et Ins.* iv. 119. t. 13. f. 6 ♀, 8 ♂:

Shuck. Foss. Hym. 33. 1.

Guér. Icon. Règ. Anim. Ins. 429. t. 69. f. 6.

Nyland. Ap. Boreal. 16. 2.

Wesm. Hym. Foss. Belg. 21.

Myrmosa atra, *Panz. Faun. Germ.* 85. 14 ♂.

St. Farg. Hym. iii. 590. 2.

Lucas, Explo. Sc. Algér. iii. 287.

Myrmosa nigra, *Latr. Gen. Crust. et Ins.* iv. 120.

St. Farg. Hym. iii. 591. 4.

Myrmosa brunnipes, *St. Farg. Hym.* iii. 590. 3, var.

Female. Length $1\frac{1}{2}$ –3 lines.—Head black and coarsely punctured, the face frequently ferruginous; the basal half of the

antennæ and the mandibles red, the tips of the latter griseous. Thorax shining red, and coarsely punctured; legs red, spinose outside, and slightly pubescent. Abdomen black and shining; the first segment and base of the second red; the apical margin of the second, third, and sometimes the fourth, red, with the two apical segments entirely red; the basal segment coarsely punctured; the second and following segments with scattered punctures; the apical margins ciliated with glittering white hairs, also a few thinly scattered at the sides of the abdomen.

Var. β .—The second segment entirely black, and only the basal and apical segments red.

Male. Length 3–4½ lines.—Black, coarsely punctured, and covered with a scattered griseous pubescence; the wings slightly coloured and beautifully iridescent, the nervures black.

This insect has been taken at Hampstead, Charlton, Coombe Wood, Weybridge, and Hawley Green, Hants; Sandown Bay and Luccomb Chine, Isle of Wight; at Deal, Lowestoft, Suffolk, and Southend; also near Wakefield, Yorkshire. This proves the species to be widely distributed. At Weybridge, twelve specimens of the female were taken in a small sand-pit, the males being plentiful on flowers, in the second week in August.

Genus 3. METHOCA.

Methoca, *Latr. Hist. Nat.* xiii. 268 ♀ (1805).

Mutilla, pt., *Jurine, Hym.* 266 (1807).

Tengyra, *Latr. Gen. Crust. et Ins.* iv. 116 ♂ (1809).

Female.—Head subglobose; eyes oval and lateral; the stemmata placed in a triangle high on the vertex; antennæ filiform, inserted at the lateral posterior margins of the clypeus, rather longer than the thorax; the clypeus triangular; the mandibles arcuate. The thorax elongate, doubly strangulated, rounded at the base and apex; legs long and slender, the coxæ very robust; femora subclavate; the tarsi longer than the tibiæ. Abdomen ovato-conical, attached to the thorax by a short petiole.

Male.—Head transverse, flattened in front, convex behind; eyes oval, prominent, and lateral; the stemmata large, placed in a triangle on the vertex; antennæ filiform, tapering to a point at their apex; the scape very short; the joints of the flagellum beyond the third subarcuate. Thorax oblong, the

collar extending to the insertion of the wings; the metathorax obtuse; 'the anterior wings with one elongate marginal cell, which is pointed at its apex, and extends nearly to the tip of the wing; three submarginal cells, the first as long as the two following, receiving the first recurrent nervure; the second quadrangular, receiving the second recurrent nervure, the third extending to the apex of the wing. Abdomen linear, the segments subcrenate; the hypopygium produced laterally into two vertical plates, acute at their extremity, beneath produced into a long upcurved acute spine.

Of the habits of this genus we are in ignorance; the single British species is one of great rarity. M. Wesmael confirmed the propriety of uniting the sexes, by taking them *in coitu*; otherwise the disparity of the sexes is so great, that they would still have formed types of different genera. I suspect that, like the *Thynnidae*, they will prove to be parasitic.

1. *Methoca ichneumonides*.

Fæmina.—Nigra, nitida; thorace pedibusque rufis.

Mas.—Niger, immaculatus.

Methoca ichneumonides, Latr. *Hist. Nat.* xiii. 269 ♀.

Guér. *Icon. Règ. Anim.* 429. t. 69. f. 7, 8.

Curtis, *Brit. Ent.* vii. t. 329 ♀.

Shuck. *Foss. Hym.* 36. 1.

St. Farg. *Hym.* iii. 573. t. 36. f. 2 ♂.

Nyland. *Ap. Boreal.* 19. 1.

Wesm. *Hym. Foss. Belg.* 22.

Mutilla formicaria, Jurine, *Hym.* 266. t. 13. f. 49 ♀.

Tengyra Sanvitali, Latr. *Gen. Crust. et Ins.* iv. 116 ♂.

Van d. Lind. *Obs.* i. 13.

Lucas, *Explo. Sc. Algér.* iii. 287.

Female. Length $2\frac{1}{2}$ – $3\frac{1}{2}$ lines.—Head and abdomen black; the thorax, legs and antennæ ferruginous; the head shining, with a few scattered punctures; the apex of the antennæ fuscous; the anterior tarsi ciliated, and all the legs slightly spinose. Abdomen shining, the apex more or less ferruginous.

Male. Length 5 – $5\frac{1}{2}$ lines.—Black and shining, with a scattered griseous pubescence; the face closely punctured, the vertex more sparingly so; the tips of the mandibles ferruginous; the prothorax punctured anteriorly, its hinder margin impunctate; the mesothorax with large scattered punctures, and having two

central longitudinal lines extending from base to apex; an abbreviated line on each side in front, terminating opposite the tegulæ; the scutellum deeply punctured; the metathorax coarsely rugose; the wings hyaline, iridescent, occasionally slightly fuscous, their nervures rufo-testaceous; the tarsi more or less testaceous. Abdomen shining, delicately and sparingly punctured; base of the segments much depressed, their margins constricted.

This is a rare insect, but has occurred at Black Gang Chine and Sandown Bay, Isle of Wight; at Blackwater, Hants; on Hampstead Heath; and at Southend, Essex; it has also been taken at Lyme Regis, Dorset. I captured five females and three males on one occasion at Weybridge, on the 8th of August; also another male in August, at Blackwater. *Methoca* is the British representative of the genus *Thynnus*; the latter, as observed by Mr. Bakewell, of Lower Plenty, South Australia, is parasitic upon Lepidoptera. Mr. Bakewell obtained specimens of *Thynnus* from the cocoons of moths which had been dug up from the ground, thus proving the habit of that interesting genus of insects.

Tribe II. FOSSORES, Latr.

The sexes two, male and female, both furnished with wings; the anterior wings not longitudinally folded; legs of the females usually adapted for burrowing, never adapted for collecting pollen; the first joint of the posterior tarsi never wider than the following ones; the tongue never lanceolate or filiform. The posterior margin of the prothorax, or collar, sometimes prolonged on each side as far as the insertion of the superior wings; the collar usually arched.

Fam. 1. Scoliadæ, Leach.

The females have usually the legs very robust, and thickly spinose, or densely ciliated; the femora arcuate at their extremity and compressed; the antennæ stout, shorter than the thorax; the eyes in the typical genus (*Scolia*) notched.

Genus 1. TIPHIA.

Tiphia, pt., *Fabr. Ent. Syst.* ii. 223 (1793).

Bethylus, pt., *Panz. Krit. Revis.* ii. 134 (1805).

Head as wide as the thorax; eyes ovate and lateral; stemmata in a triangle on the vertex; antennæ filiform, shorter than the thorax; the scape short and stout; the first joint of the flagellum shortest, the rest of nearly equal length; the antennæ are curved in the female, but straight in the male; the mandibles arcuate, with a longitudinal groove exteriorly. Thorax elongate, the collar transverse in front, the hinder margin extending to the insertion of the wings; the metathorax abruptly truncated, the sides deeply excavated; *the anterior wings with one marginal cell, open at its apex in the female, but closed in the male; two submarginal cells, the first elongate, twice as long as the second, receiving the first recurrent nervure; the second submarginal, widened at its apex, receiving the second recurrent nervure about one-third from its apex;* the legs short and stout, the femora wide and compressed; the intermediate and posterior tibiæ thickly spinose; the tarsi elongate, the apex of the joints with long rigid cilia; the claws bifid, with a small pulvillus between them. Abdomen elongate, ovate, petiolated; the petiole short, toothed on each side; the first segment subpyriform, narrower than the second; the apex, in the male, furnished with an upcurved spine.

1. *Tiphia femorata*.

Fæmina.—Nigra, pilosa; femoribus quatuor posticis compressis rufis, linea intermedia elevata metathoracis lineam transversam non attingente.

Mas.—Totus niger.

Tiphia femorata, *Fabr. Syst. Ent.* 353. 1 ♀; *Ent. Syst.* ii. 223. 1; *Syst. Piez.* 232. 1.

Rossi, Faun. Etrus. ii. 67. 828.

Panz. Faun. Germ. 53. 2.

Latr. Hist. Nat. xiii. 267.

Jurine, Hym. 149. t. 9. f. 11 ♀.

Spin. Ins. Ligur. i. 81. 1.

St. Farg. & Serv. Ency. Méth. x. 655.

Van d. Lind. Obs. 279. 1.

- Tiphia femorata*, Shuck. Foss. Hym. 39. 1.
St. Farg. Hym. iii. 573. 1. t. 36. f. 2 ♀.
Nyland. Ap. Boreal. 19. 1.
Wesm. Hym. Foss. Belg. 23. 1.
Bethylus femoratus, Panz. Faun. Germ. Krit. Revis. ii. 134 ♀.
Tiphia villosa, Fabr. Syst. Piez. 235. 22 ♂.
Latr. Hist. Nat. xiii. 267.
Van d. Lind. Obs. 280. 2.
Bethylus villosus, Panz. Faun. Germ. 98. 16.

Female. Length 4-6½ lines.—Black, shining and punctured, the punctures strong, not very close, with a scattered griseous pubescence; the wings fusco-hyaline, the tegulæ and nervures piceous; the intermediate and posterior legs ferruginous, with the coxæ black, the tarsi piceous; the metathorax with three elevated longitudinal lines, the two lateral ones extending from the base to the verge of the truncation, the intermediate line not reaching the truncation. Abdomen: the extreme apex rufo-piceous.

Male. Length 3-4 lines.—Entirely black; otherwise closely resembling the female, with the wings hyaline, the nervures black.

This species is very local, but extremely numerous in some situations. In the month of August it has been taken in abundance at Birch Wood, Kent. Mr. S. Stevens took a series of very large examples in Devonshire, most of them 6 lines in length. I have taken it at Blackwater, Hants; at Sandhurst and near Windsor, also at Southend and Deal. The males pass the nights enclosed in the petals of flowers; the females I have frequently found beneath dry cow-dung, and have a suspicion they may be parasitic on species of *Aphodius*. At Lowestoft, Suffolk, this species occurs in immense numbers, settling on the heads of the wild carrot (*Daucus Carrota*) on the slopes of the cliffs and on their tops. Amongst the many hundreds examined, taken in different localities, I have never found a female with black legs.

2. *Tiphia minuta*.

T. nigra, breviter griseo-pubescent; tibiis apice tarsisque rufis, et linea intermedia metathoracis ad lineam transversam excurrente.

- Tiphia minuta*, Van d. Lind. Obs. i. 12. 4.
Shuck. Foss. Hym. 42. 3.
Curtis, Brit. Ent. xiv. t. 644 ♂.

Tiphia minuta, *St. Farg. Hym.* iii. 558. 9.

Nyland. Ap. Boreal. 24. 3.

Weism. Hym. Foss. Belg. 23. 2.

Female. Length 2-3 lines.—Black and shining, with scattered punctures; antennæ rufo-piceous beneath; mandibles rufescent in the middle. Thorax: wings fusco-hyaline, the stigma large and black, the nervures piceous; the joints of the legs and the tarsi rufo-piceous, the latter densely ciliated; the posterior tibiæ strongly serrated exteriorly; the metathorax with three longitudinal elevated parallel lines, all extending from its base to the verge of the truncation. Abdomen densely pubescent, the apical segment rufo-piceous.

Male. Length 2-3 lines.—Only differs from the female in having the antennæ and mandibles entirely black, and the tarsi redder.

The venuration of the anterior wings is frequently incomplete; the first transverso-cubital nervure is often obsolete on one or both wings.

This is a rare species, but is occasionally taken near London; it has occurred at Hampstead Heath, Southgate, and Colney Hatch; it has also been taken near Bristol, at Glanville's Wootton, Dorset, and at Branton Burrows, Devon.

Fam. 2. Sapygidæ, *Leach.*

The legs without spines; the antennæ elongate, as long as the head and thorax, usually clavate or subclavate; the eyes emarginate.

Genus 1. SAPYGA.

Apis, pt., *Linn. Syst. Nat.* i. 953 (1766).

Scolia, pt., *Fabr. Syst. Ent.* 355 (1775).

Sirex, pt., *Fabr. Mant.* i. 257 (1787).

Sapyga, *Latr. Précis*, p. 134 (1769).

Masaris, pt., *Panz. Faun. Germ. fasc.* 47 (1801).

Hellus, pt., *Fabr. Syst. Piez.* 246 (1804).

Head a little wider than the thorax, subrotund; eyes emarginate; stemmata in a triangle on the vertex; antennæ as long as the head and thorax, subclavate; labrum minute; mandibles stout and dentate. Thorax subcylindrical, truncated anteriorly, rounded posteriorly; the collar extending laterally to the tegulæ;

the anterior wings with one marginal and four submarginal cells, the marginal cell acute; the second submarginal the smallest, subquadrate, and receiving the first recurrent nervure; the third receiving the second near its base; the legs slender; the tarsi elongate. Abdomen elongate and subsessile.

The economy of this genus of insects has been a disputed point with entomologists: by some they are stated to be parasitic; by others, that they store up the larvæ of Lepidoptera for their young brood: St. Fargeau states that he observed the latter circumstance. I have also observed the same fact: the female was seen hovering about a sand-bank closely perforated by a species of *Colletes*, and was carrying its prey, with which it entered a burrow; the prey appeared to be a caterpillar, and on digging into the bank, four cells filled with small green caterpillars were found; the contents of each was carefully placed in a separate pill-box, and from each mass was reared a specimen of *Sapyga punctata*: when the larva is full-grown it spins a tough brown cocoon, similar to that of an *Osmia*. It is most probable that *Sapyga* never constructs its own burrow, but avails itself of one formed by some other insect. They may be observed, not uncommonly, entering the burrows of *Chelostoma*, and of different species of *Osmia*. The fact of the larvæ feeding on caterpillars proves that Robineau-Desvoidy was deceived by finding the cocoons of *Sapyga* in snail-shells occupied also by *Osmia hellicicola*: from this circumstance he concluded that the *Sapyga* was parasitic; but its being found there only proved that it had equal sagacity to the *Osmia*, and consequently availed itself of the ready-formed tubes, so admirably adapted for its purposes.

1. *Sapyga punctata*.

S. nigra; abdomine rufo, punctis transversis albis. *Fæm.*

S. nigra; abdomine nigro, punctis transversis albis. *Mas.*

Scolia quinquepunctata, *Fabr. Spec. Ins.* i. 453. 14 ♀; *Ent. Syst.* ii. 235. 27.

Scolia quadriguttata, *Fabr. Spec. Ins.* i. 454. 15 ♂; *Ent. Syst.* ii. 235. 29.

Sirex pacca, *Fabr. Mant.* i. 258. 15 ♀.

Sapyga punctata, *Klug, Mon. Siric. Germ.* 61. t. 7. f. 4 ♀, 5 & 6 ♂. *Panz. Faun. Germ.* 100. 17 ♂.

Spin. Ins. Lig. i. 76. 1.

Van d. Lind. Obs. 302. 1.

Shuck. Foss. Hym. 44. 1.

Sapyga punctata, Nyland. *Ap. Boreal.* 25. 1.

Wesm. Hym. Foss. Belg. 25. 1.

Hellus sexpunctatus, quadriguttatus, et *pacca*, *Fabr. Syst. Piez.* 247. 1, 3 & 6.

Sapyga quadripunctata, *Panz. Faun. Germ.* 87. 20 ♂.

Sapyga decemguttata, *Jurine, Hym.* 160. t. 9. f. 13 ♂.

Sapyga sexpunctata, *Latr. Nouv. Dict.* ed. 2. p. 30. 179.

Sapyga varia, *St. Farg. & Serv. Enc. Méth.* x. 338. 1.

Guérin, Icon. Règ. Anim. Ins. 432. t. 69. f. 11 ♀.

Female. Length $3\frac{1}{2}$ – $5\frac{1}{2}$ lines.—Black; the head and thorax coarsely punctured; the antennæ piceous beneath; a white spot on each side of the clypeus at its base, another above it, and a line along the lower portion of the emargination of the eyes. Thorax: the collar with a white line on each side at the verge of the truncation; wings slightly coloured, their extreme apical margins with a narrow fuscous border, the nervures black. Abdomen punctured, the second and third segments red, their apical margins piceous; sometimes the apical margin of the first segment red; a transverse ovate white spot on each side in the middle of the fourth and fifth segments, the first pair largest; the sixth with a large white spot in the centre.

Var. β. The clypeus immaculate.

Male. Length 4–5 lines.—Black; the clypeus white; the fourth and ninth joints of the antennæ yellow beneath; the tibiæ with a yellow spot at their base above, one or more of these spots frequently wanting. Abdomen: a transverse white spot on each side in the middle of the second and three following segments, those on the second and fifth frequently more or less obliterated, or entirely so; beneath, a transverse white line on each side of the third and fourth segments.

This is an abundant species in many localities; it appears about the end of May, and is usually to be seen running on palings, rails, &c., particularly if any of the wood-boring bees frequent them, such as *Chelostoma* or *Osmia*, doubtless in search of some ready-formed burrow suitable for its own purposes. It is not uncommon about the metropolis; I have taken it in Yorkshire, Kent, Hants, &c.; it occurs also in Devon, near Exeter, and is, I suspect, very generally distributed.

2. *Sapyga clavicornis*.

S. nigra; abdomine flavo-fasciato. *Mas et Fæm.*

Apis clavicornis, *Linn. Faun. Suec.* 419. 1686 ♂; *Syst. Nat.* i. 953.

Scolia prisma, *Fabr. Mant.* i. 282. 21; *Ent. Syst.* ii. 236. 31.

- Sphex prisma*, Vill. Ent. iii. 244. 66 ♀.
Masaris crabroniformis, Panz. Faun. Germ. 47. 22 ♀.
Hellus prisma, Fabr. Syst. Piez. 247. 5.
Sapyga prisma, Klug, Mon. Siric. Germ. 63. t. 7. f. 7 ♀, 8 ♂
Latr. Hist. Nat. xiii. 273. 2.
Van d. Lind. Obs. 303. 2.
Wesm. Hym. Foss. Belg. 25. 2.
Sapyga clavicornis, Curtis, Brit. Ent. xi. t. 532 ♂.
Shuck. Foss. Hym. 45. 2.*
Nyland. Ap. Boreal. 27. 2.

Female. Length $4\frac{1}{2}$ lines.—Black; the head and thorax coarsely punctured; the apical joint of the antennæ yellow beneath, and two yellow spots between them at their base; a transverse line on each side of the anterior margin of the prothorax; the tibiæ with a longitudinal yellow stripe at their base outside; the tarsi and tibiæ simple; the wings slightly coloured, their nervures black. Abdomen: a yellow spot on each side of the second segment, a subinterrupted band on the third and fourth, and a large central spot on the sixth, yellow; beneath, a transverse ovate spot on each side of the third and fourth segments.

Male. Length 4 lines.—The antennæ capitate, much longer than the thorax, and the joints of the flagellum from the second to the tenth yellow beneath; the clypeus yellow; the thorax with a yellow spot at the extreme angles of the collar; the anterior tibiæ in front, and a yellow line on the outside of the base of all the tibiæ, yellow. Abdomen as in the female, with the exception of the spot on the sixth segment, which in the male is on the seventh. The spots on the abdomen in both sexes are subject to much variation in size and in intensity of colouring.

This species is not found in the London district; Mr. Newman first captured a British specimen in Herefordshire; it is plentiful in some parts of the north of England, and has been captured at Nottingham, Birmingham, and near Wakefield—at the latter place as late as the 18th of July. It appears about the beginning of June; it frequents similar situations as the former species.

Fam. 3. Pompilidæ, Leach.

Prothorax usually transverse and broader than long, in one or two genera oblong-quadrate; the posterior margin arcuate or subangular; legs elongate; abdomen more or less oval, attached to the thorax by a short peduncle.

Genus 1. POMPILUS.

- 'Sphex, pt., *Linn. Syst. Nat.* i. 941 (1766).
 Evania, pt., et Sphex, pt., *Fabr. Ent. Syst.* ii. 192 & 198 (1793).
 Pompilus, pt., *Fabr. Ent. Syst. Supp.* 246 (1798).
 Ceropales, pt., et Pompilus, pt., *Fabr. Syst. Piez.* 185 & 187 (1804).
 Priocnemis, Agenia, Pompilus, et Episyron, *Schödtle, Mon. Pomp. Kröy. Tidsskr.* i. 321, 324, 331 (1837).
 Calicurgus, Anoplius, et Pompilus, *St. Farg. Hym.* iii. 397, 416, 440 (1845).

Head transverse; eyes lateral, oblong-ovate; stemmata placed in a triangle on the vertex; antennæ convolute in the female, setaceous, elongate, inserted in the middle of the anterior part of the face, approximating at their base; in the male differing in being only slightly bent; the labrum entirely concealed, or but very slightly disclosed; mandibles arcuate and unidentate, sometimes bidentate. Thorax oblong, truncate or obtuse at the apex; the anterior wings with one marginal and three submarginal cells, the first usually as long as the two following, the second receiving the first recurrent nervure about the centre, the third receiving the second recurrent nervure; the posterior legs elongate, the claws bifid, with a small pulvillus between their fork. Abdomen ovate in the female, elongate in the male.

The form of the cells of the wings in the different species of this genus is very inconstant, in some species varying in different individuals. In *P. niger* the third submarginal cell is, in its typical form, acutely narrowed towards the marginal cell; in many examples it will be found to be distinctly petiolated. *P. fuscus* is subject to a similar variation, but not quite so extreme. *P. pectinipes* is also variable in the neuration of the anterior wings; the second transverso-cubital nervure is sometimes obsolete; when so in both wings, it has been mistaken for Spinola's genus *Aporus*, and constitutes St. Fargeau's genus *Evagethes*; sometimes this nervure is only obsolete on one side, as recorded by Shuckard in his remarks on *P. crassicornis*. In *P. notatus* the form of a single nervure serves as an excellent specific distinctive character.

The armature or spines on the legs of some species, and their absence in others, have by some authors been regarded as characters of full generic value; but we only adopt them as sub-generic distinctions, indicating a difference of habit in those spe-

cies in which they are present or absent. A close and constant observation of these insects furnishes a clue to some apparent difficulties. Amongst the British species, none are more eminently fossorial than *P. plumbeus* and *rufipes*; these species form their burrows in hard sand-banks, the latter preferring those situated on the sea-coast. *P. variegatus* prefers, on the contrary, banks of soft sandy loam: I captured many specimens in the act of burrowing in a situation of that kind in the north of England. *P. punctum* is a species destitute of cilia on the anterior tarsi,—a sure indication of a difference of habit; this species constructs a number of mud-cells, placed irregularly side by side, much resembling those constructed by *Pelopæus*: from a nest of this description, discovered by the Rev. W. Delmar near Canterbury, five individuals were developed. These differences of habit in species of the same genus have many parallels in other genera of the Aculeata; we may instance the genera *Osmia* and *Megachile* amongst the Bees.

DIV. I.—*Anterior tarsi of the females ciliated; the intermediate and posterior tibiæ with a double row of spines.*—Pompilus.
Sp. 1–9.

1. *Pompilus fuscus*.

P. niger; alis fuscis, apicibus nigris; abdomine segmentis tribus primis ferrugineis, cingulis nigris. *Mas et Fœm.*

Sphex fusca, Linn. *Faun. Suec.* 412. 1652; *Syst. Nat.* i. 944. 16 ♀, & *Cab. Mus. Linn. Soc.*

De Geer, Ins. ii. 822. t. 28. f. 6.

Sphex viatica, Scop. *Ent. Carn.* 294. 780.

Fabr. Syst. Ent. 349. 20; *Ent. Syst.* ii. 210. 47 ♀.

Rossi, Faun. Etrus. ii. 62. 814.

Müller, Prodr. Zool. Dan. 160. 1864.

Pompilus viaticus, *Fabr. Ent. Syst. Suppl.* 246. 4; *Syst. Piez.* 191. 12.

Panz. Faun. Germ. 65. 16; *Krit. Revis.* ii. 118.

Spin. Ins. Ligur. i. 68. 2.

St. Farg. & Serv. Encycl. Méth. x. 179. 1; *Hym.* iii. 431. 24.

Van d. Lind. Hym. 342. 40 ♂ ♀.

Shuck. Foss. Hym. 61. 12.

Zett. Ins. Lapp. 437. 3.

Dahlb. Mon. Pomp. 44; *Exercit. Hym.* 62. 4; *Hym. Europ.* i. 57. 29.

Brullé, Exped. Sc. de Morée, iii. 364. 804.

Lucas, Explo. Sc. Algér. iii. 248.

Wesm. Hym. Foss. Belg. 39. 15.

Pompilus fuscus, *Latr. Hist. Nat.* xiii. 280. 1.

Schüdtle, Mon. Pomp. Kröy. Tidsskr. i. 339. 8.

Ratz. Forst. Ins. Bd. iii. 34. 14.

Smith, Cat. Brit. Hym. 13. 12.

Female. Length 5-7 lines.—Black, slightly shining; the head and mandibles sprinkled with long black hairs, the anterior margin of the clypeus rounded. Thorax: the prothorax with a few long black hairs; the metathorax short, convex, and truncated posteriorly, and with a central slightly impressed line at its base; the wings fusco-hyaline, with a broad black marginal band; the third submarginal cell usually triangular, with the outer nervure arched, sometimes petiolated; the anterior tarsi ciliated; the intermediate and posterior tibiae with a double row of spines, which are continued to the apex of the first joint of the tarsi. Abdomen with the three basal segments ferruginous, a black band on the apical margins of the second and third, that on the first piceous.

The *Male* only differs in being more slender and smaller, in having silvery pubescence on the face, and sericeous pubescence on the metathorax and coxæ; the legs are less spinose, the anterior tarsi not ciliated; the fifth and sixth ventral segments emarginate, the sixth most strongly so, and with a deep fossule on each side of the emargination; the seventh has a longitudinal carina at its base, and its apex truncated.

There cannot be a doubt of this being the *S. fusca* of Linnæus when we study the description in the 'Fauna Suecica,' and bear in mind that the typical specimen in the Linnæan Cabinet has the name "*fusca*" in the hand-writing of Linnæus attached to the specimen, and which the description suits much better than *S. viatica*.

This species is found in all parts of the United Kingdom: it stores up spiders for the food of its young brood.

2. *Pompilus gibbus*.

P. niger; abdomine ferrugineo, apice nigro; metathorace subtiliter punctato; alis anticis apicibus nigris. *Mas et Fæm.*

Spheg gibba, *Fabr. Syst. Ent.* 350. 23; *Ent. Syst.* ii. 212. 59 ♀.

Rossi, Faun. Etrus. ii. 63. 816.

Pompilus gibbus, *Fabr. Ent. Syst. Suppl.* 249. 17; *Syst. Piez.* 193. 27.

Panz. Faun. Germ. 77. 13; *Krit. Revis.* ii. 119.

St. Farg. & Serv. Encycl. Méth. x. 179. 2.

Van d. Lind. Obs. i. 338. 35 ♂ ♀.

Shuck. Foss. Hym. 62. 13.

- Pompilus gibbus*, *Schödte, Mon. Pomp. Kröy. Tidsskr. i.* 336. 6.
Brullé, Hist. Nat. Il. Canar. iii. 92. 57.
St. Farg. Hym. iii. 435. 30.
Lucas, Explo. Sc. Alger. iii. 248.

Female. Length 3-5 lines.—Black and shining; head delicately punctured and slightly pubescent, tips of the mandibles ferruginous. Thorax short, the sides and metathorax covered with a fine griseous pile; a very slight longitudinal impressed line at the base of the metathorax, which is very obtuse and delicately punctured; the wings slightly coloured, their apical margins with a broad fuscous band; the third submarginal cell much narrowed towards the marginal; the anterior tarsi slightly ciliated, and the intermediate and posterior tibiæ with a double row of spines. Abdomen: the first, second, and base of the third segment ferruginous, with their apical margins sometimes slightly piceous.

Male. Length $2\frac{1}{2}$ - $3\frac{1}{2}$ lines.—Closely resembles the female, but is of a much more slender form; the face covered with silvery pubescence; the anterior tarsi not ciliated, the legs less spinose; the metathorax and abdomen more covered with silky pile, and more elongate.

This is an exceedingly abundant species, and is universally distributed: it preys upon spiders.

3. *Pompilus pectinipes.*

P. niger; abdomine ferrugineo, apice nigro; alis anticis apicibus fuscis; antennis crassis.

Sphex pectinipes, *Linn. Faun. Suec. no.* 1654, & *Cab. Mus. Linn. Soc.* ♀.

Aporus bicolor, *St. Farg. & Serv. Encycl. Méth. x.* 185. 1 (var.).
Shuck. Foss. Hym. 721. 1.

Aporus dubius, *Van d. Lind. Obs. i.* 351. 4?

Dahlb. Hym. Europ. i. 37. 21.

Wesm. Hym. Foss. Belg. 49. 2.

Evagethes bicolor, *St. Farg. Hym. iii.* 270. 1 (var.).

Pompilus pectinipes, *Van d. Lind. Obs. i.* 341. 39 ♀.

Dahlb. Hym. Europ. i. 68. 33.

St. Farg. Hym. iii. 433. 26.

Wesm. Hym. Foss. Belg. 49. 17 ♀ ♂.

Pompilus crassicornis, *Shuck. Foss. Hym.* 63. 14 ♀.

Dahlb. Disp. 10. 39.

Pompilus difformis, *Schödte, Dispos.* 27. 8. t. 4. f. 4.

Female. Length 3-4 lines.—Black; the head and thorax slightly shining; the clypeus with a little silvery pubescence; the an-

tennæ as thick as the anterior tibiæ, frequently rufo-fuscous beneath; the mandibles ferruginous at their apex. Thorax covered with a fine sericeous pile, which is most dense on the coxæ, femora and metathorax; the wings obscure, their apical margins dark fuscous; the metathorax with a longitudinal central impressed line; the anterior tarsi ciliated exteriorly, the intermediate and posterior tibiæ with a double row of spines. Abdomen: the first, second, and base of the third segment red; the abdomen covered with a fine silky pile, which is most dense at the base of the segments.

Male. Length 3–3½ lines.—Covered with fine silky pile; antennæ incrassate; the base of the first segment of the abdomen black, the remainder ferruginous, as well as the whole of the second segment, and sometimes the extreme base of the third; the venter, with the apical margin of the fourth segment, slightly emarginate, the fifth and sixth deeply so, the apical segment subcarinate.

This species at first sight very closely resembles *P. gibbus*. The thickness of the antennæ is a good distinctive character; but in a number of examples some will have these organs less incrassate. The best character whereby to distinguish the female appears to be the posterior margin of the prothorax, which is arched; in *P. gibbus* it is angular. The male is known immediately by the emargination of the ventral segments of the abdomen; in *P. gibbus* they are entire.

This is a local insect, which I have not taken in the vicinity of London: Shuckard found it on Hampstead Heath; it occurs sparingly at Southend, but more abundantly at Deal. The female provisions its nest with spiders.

4. *Pompilus spissus*.

P. niger; abdomeine ferrugineo, apice fusco; alis anticis cellulis cubitalibus, tertia subquadrata.

Pompilus spissus, Schödtle, Kröy. Tidsskr. i. 336. 5 ♂ ♀.

Dahlb. Hym. Europ. i. 70. 34.

Wesm. Hym. Foss. Belg. 35. 9.

Female. Length 4–4½ lines.—Black, with a thin sericeous pile; the two basal segments of the abdomen and the base of the third ferruginous. Very closely resembling *P. gibbus*; the head however is more convex in front, the antennæ are rather stouter, the thorax more robust, with the metathorax shorter and more convex, and having the faintest trace of an impressed line in the middle of its base; the anterior wings have the marginal

cell longer and the third submarginal cell subquadrate, never triangular as in *P. gibbus*; the anterior tarsi very slightly spinose, not ciliated.

Male.—This sex resembles that of *P. gibbus*; but the thorax is shorter; the head and thorax with a thin black pubescence; the wings as in the female.

This species, although closely resembling *P. gibbus*, is very distinct: the neurulation of the wings is the most striking difference; but the absence of the regular cilia which distinguish *P. gibbus* is a strong specific character. The species does not occur in the London district, but has been taken, not rarely, at Bristol; it is also found in Yorkshire.

5. *Pompilus plumbeus*.

P. ater, cinereo-pubescent; abdominis basi atro; alis albis, apicibus nigris. *Fæm*.

P. plumbeus; antennis atris; alis anticis apicibus nigris. *Mas*.

Sphex plumbea, *Fabr. Mant.* i, 278. 64; *Ent. Syst.* ii. 220. 92 ♂.
Rossi, Faun. Etrus. i. 127. 280.

Pompilus pulcher, *Fabr. Ent. Syst. Supp.* 249. 19 ♀.

Spin. Ins. Ligur. i. 69. 4.

Van d. Lind. Obs. i. 307. 2 ♂ ♀.

Shuck. Foss. Hym. 49. 1.

Dahlb. Hym. Europ. i. 42. 22?

St. Farg. Hym. iii. 424. 11.

Lucas, Explo. Sc. Algér. iii. 268. 2.

Pompilus plumbeus, *Dahlb. Hym. Europ.* i. 42. 21. & 444. 3.

Wesm. Hym. Belg. 33. 5.

Female. Length 3-4 lines.—Black; the clypeus, sides of the face and the scape, densely covered with a silvery-grey pubescence; the mandibles ferruginous at their apex; a longitudinal impressed line runs from the anterior stemma to the base of the clypeus. Thorax: the posterior margin of the prothorax subangular; the metathorax with a deep central longitudinal impression; the wings slightly coloured, the apical margins of the anterior pair with a broad fuscous band, the nervures black; the legs covered with grey pile, the anterior tarsi ciliated, and the intermediate and posterior tibiae with a double row of spines. Abdomen: the apical margins of the segments with a band of grey pubescence, slightly differing in width in different individuals, and sometimes more or less interrupted.

Male.—Rather smaller than the female, the face with more of

the silvery pubescence, and the entire insect covered with slate-coloured pubescence, with the extreme base of the segments of the abdomen shining black.

This species is not found in the London district; it has been taken at Southend, Weybridge, Heron Court, Hants, Sandown Bay and Luccomb, Isle of Wight, near Exeter, and at St. Margaret's Bay and Dover; it is extremely abundant on the sand-hills near Deal, and also at Lowestoft, Suffolk. The insect usually makes its appearance about the beginning of July: the males are exceedingly active, and difficult to capture.

6. *Pompilus niger*.

P. niger; alis hyalinis, apicibus fuscis; abdominis segmentorum marginibus lucidis.

Spheg nigra, *Fabr. Syst. Ent.* 350. 22; *Ent. Syst.* ii. 211. 51.

Rossi, Faun. Etrus. ii. 64. 819.

Pompilus niger, *Fabr. Ent. Syst. Supp.* 247. 8; *Syst. Piez.* 191. 15.

Panz. Faun. Germ. 71. 19.

St. Farg. & Serv. Encycl. Méth. x. 180. 4.

Van d. Lind. Obs. i. 306. 1.

Shuck. Foss. Hym. 50. 2.

Dahlb. Hym. Europ. i. 45. 24.

Zett. Ins. Lapp. 439. 9.

Schiodte, Mon. Pomp. Kröy. Tidskr. i. 334. 3.

Weem. Hym. Foss. Belg. 34. 8.

Anoplius niger, *St. Farg. Hym.* iii. 451. 17.

Anoplius miscoides, *St. Farg. Hym.* iii. 451. 16? (var.)

Female. Length 4-5½ lines.—Black and shining; the clypeus and mandibles with a few long rigid hairs; the mandibles ferruginous towards their apex, with the tips black. Thorax: the posterior margin of the prothorax angulated; the metathorax short and very convex; the wings slightly fuscous, with a broad fuscous cloud on their apical margins, and which also occupies the upper portion of the marginal cell; the third submarginal cell triangular, sometimes petiolated, most frequently so in the males; the anterior tibiae and tarsi with a row of short slight spines; the intermediate and posterior tibiae and basal joint of the tarsi with a double row of slight spines; the coxae with a fine silvery down. Abdomen: the basal margin of the second and third segments with more or less of a fine whitish pile, the apex with a few long black hairs.

Male.—Usually much smaller than the female, more slender in form, the abdomen elongate; the face with a fine silvery pile;

the legs spinose; the abdomen with the fifth ventral segment slightly emarginate.

This species is by no means abundant; it occasionally occurs in the London district; it has also been taken at Hawley, Hants, and at the Undercliff, Isle of Wight. It provisions its nest with the larvæ of Lepidoptera, and has several times been captured with a small green caterpillar.

7. *Pompilus acuminatus*.

P. ater; clypeo metathoraceque cinereo-pubescentibus; alis hyalinis, apicibus fuscis; abdominis apice acuminato.

Pompilus acuminatus, *Smith, Cat. Brit. Hym.* 119.

Male. Length 4 lines.—Black; head very delicately punctured, with a few larger punctures intermixed; the clypeus with a thin silvery pile; the antennæ about as long as the thorax, robust, and of uniform thickness, the apical joint acuminate. Thorax very delicately punctured, the metathorax more strongly so, and covered with silvery pubescence, which is dense at the sides; the sides of the thorax and the coxæ covered with a changeable pile; wings hyaline, their apical margins clouded; the second submarginal cell large and oblong, wider than the third, which is narrowed by one-third towards the marginal; legs nigro-piceous, the anterior pair simple, the intermediate and posterior pairs with a double row of slight spines. Abdomen narrower than the thorax, smooth, shining, covered with thin iridescent pile, and compressed posteriorly; the extreme apex pale testaceous.

This species was sent to me some years ago from Scotland, since which it has not been captured; there is a second specimen in the Cabinet at the British Museum, from the collection of the late James Francis Stephens, Esq.

8. *Pompilus cinctellus*.

P. niger, cano-pubescent; clypeo albido, macula nigra; fronte puncto utrinque ad marginem internum oculorum, prothoracis lineola utrinque albidis; pedibus rufis; alis albis, anticis ante apicem fascia fusca. *Fem.*

P. cano-pubescent; fronte puncto utrinque ad marginem in-

ternum oculi, tibiæ posticarum basi, et abdominis segmento septimo supra, albidis; pedibus nigris. *Mas.*

Pompilus cinctellus, *Spin. Ins. Ligur.* ii. 39. 34 ♀.

Van d. Lind. Obs. i. 319. 13 ♂ ♀.

Shuck. Foss. Hym. 55. 6.

Schödtle, Kröy. Tidsskr. i. 333. 1. t. 4. f. a.

Dahlb. Hym. Europ. i. 38. 19.

Wesm. Hym. Foss. Belg.

Pompilus clypeatus, *Dahlb. Mon. Pomp.* 14. 22; *Exerc. Hym.* 69. 24 ♀.

Pompilus punctipes, *Dahlb. Exerc. Hym.* 65. 15 ♂.

Anoplius cinctellus, *St. Farg. Hym.* iii. 453. 19 ♀.

Anoplius tibialis, *St. Farg. Hym.* iii. 454. 21 ♂.

Female. Length 3-4 lines.—Black; covered with a slate-coloured pile; the head has an impressed longitudinal line running from the base of the clypeus up to the anterior stemma; a small white spot on the inner orbit of the eyes about the middle; the clypeus white, with a black spot in the middle of its base; the mandibles white, with their apex ferruginous. Thorax: the collar with a white spot on each side, sometimes obsolete; the metathorax densely covered with short silvery pubescence; the wings hyaline and iridescent, with a broad fuscous band towards their apex, leaving the tips white; the legs red, the coxæ black and covered with silvery pubescence, their extreme apex red; the knees and terminal joints of the tarsi piceous; the anterior pair slightly ciliated, the intermediate and posterior tibiæ with a double row of short black spines. Abdomen shining, a few black hairs at the extreme apex.

Male. Length 2-2½ lines.—Black, with sometimes a white spot on the inner margin of the eye; the face, metathorax, and coxæ with a silvery pubescence; the wings have an indistinct fascia; the anterior tibiæ within and the tarsi fulvous; a white spot at the base of the posterior tibiæ outside, sometimes obsolete; the legs with a few slight spines. Abdomen: the apical segment white above; the sixth ventral segment deeply emarginate; the seventh with a central longitudinal carina.

This species, unlike most of the genus, prefers banks of light earth for its burrows, which it provisions with small spiders, frequently selecting a white-bodied one common upon Heath. Both sexes were taken under the above circumstances in the middle of June 1845, at Hawley, Hants; it is taken in the London district, and is widely distributed, but must be considered a local species; it has been taken in Devonshire.

9. *Pompilus rufipes*.

P. ater; abdominis segmentis utrinque macula alba, alis apicibus fuscis, pedibus posticis rufis.

Sphex rufipes, *Linn. Faun. Suec.* no. 1659; *Syst. Nat.* i. 945. 29, & *Cab. Mus. Linn. Soc.*

Fabr. Ent. Syst. ii. 214. 66.

Sphex fuscata, *Fabr. Ent. Syst.* ii. 212. 57.

Pompilus fuscatus, *Fabr. Ent. Syst. Suppl.* 248. 14 (var.); *Syst. Piez.* 192. 22.

Pompilus rufipes, *Fabr. Ent. Syst. Supp.* 250. 27; *Syst. Piez.* 195. 37.

Panz. Faun. Germ. 65. 17; *Krit. Revis.* ii. 119.

Latr. Hist. Nat. Crust. et Ins. xiii. 281. 6.

Spin. Ins. Ligur. i. 69. 6.

St. Farg. & Serv. Ency. Méth. x. 180. 3.

Van d. Lind. Obs. i. 329. 24.

Curtis, Brit. Ent. v. t. 238 ♀.

Brulle, Expéd. Sc. Morée, iii. 364. 804, *Atlas*, t. 50. f. 4 ♂.

Dahlb. Mon. Pomp. 11. 16; *Exercit. Hym.* 67. 18; *Hym.*

Europ. i. 50. 27.

Shuck. Foss. Hym. 58. 9.

St. Farg. Hym. iii. 421. 7.

Wesm. Hym. Foss. Belg. 29. 3.

Pompilus albonotatus, *Van d. Lind. Obs.* i. 328. 23.

Dahlb. Hym. Europ. i. 53.

Pompilus bipunctatus, *Dahlb. Mon. Pomp.* 12. 19 (var.); *Exercit. Hym.* 67. 19.

Pompilus septemmaculatus, *Dahlb. Mon. Pomp.* 11. 17; *Exercit. Hym.* 67. 19.

Episyrus rufipes, *Schödtle, Mon. Pomp. Kröy. Tidsskr.* i. 343. 1.

Female. Length 4-6 lines.—Black; the head with thin black pubescence; a slightly impressed line passes from the anterior stemma to the base of the antennæ; the mandibles obscure ferruginous at their apex. Thorax pubescent, with the posterior margin of the prothorax arcuate; wings slightly coloured, with a dark border at their apex, the nervures black; the metathorax obtuse and shining, with a very slightly impressed longitudinal line; the posterior tibiæ and femora red, the base of the latter black; the intermediate femora and tibiæ more or less red at their apex beneath; the anterior tarsi strongly ciliated, and the intermediate and posterior tibiæ with a double row of spines. Abdomen: an ovate transverse white spot at the base of the second and third segments, that on the latter the largest; a central white spot at the base of the sixth.

Varies in having the posterior legs entirely black, and the spots on the second segment of the abdomen obsolete. A variety,

which I have not seen, according to Shuckard, has a spot on each side of the fourth segment of the abdomen, in addition to those on the two preceding segments.

Male. Length $2\frac{3}{4}$ – $4\frac{1}{2}$ lines.—This sex differs in having a silvery pubescence on the face; the second segment of the abdomen frequently wants the white spots, whilst those on the third form a subinterrupted band; sometimes, but rarely, all the spots, except the terminal one on the seventh segment, are obsolete; beneath, the sixth segment is emarginate, and the seventh has a central longitudinal carina.

This species certainly prefers situations on the coast, and I have never found it in any other locality: it has been taken at Ramsdown, Hants; at Sandown Bay, Luccomb Chine, and the Landship at Bonchurch, in the Isle of Wight; at Southend and at Deal. It appears about the middle of July, and is found until the end of September; the species is local, but very plentiful at Deal, where the black-legged variety is not uncommon. It occurs also at Lowestoft, Suffolk.

Div. II.—*The anterior tarsi simple; the intermediate and posterior tibiæ serrated exteriorly.*—*Priocnemis.* Sp. 10–17.

10. *Pompilus (Priocnemis) sepicola.*

P. niger, glaber; abdomine basi ferrugineo, alis fuscis.

Sphex fusca, *Fabr. Syst. Ent.* 349. 19; *Ent. Syst.* ii. 210. 46 (nec *Linn.*) ♀.

Rossi, Faun. Etrus. ii. 62. 813.

Pompilus fuscus, *Fabr. Ent. Syst. Suppl.* 246. 3; *Syst. Piez.* 189. 11.

Panz. Faun. Germ. 65. 15; *Krit. Revis.* ii. 118.

Van d. Lind. Obs. i. 336. 33 ♂ ♀.

Shuck. Foss. Hym. 64. 15.

Zett. Ins. Lapp. 437. 1.

Priocnemis fuscus, *Schiödde, Mon. Pomp. Kröy. Tidsskr.* i. 328. 4.

Dahlb. Hym. Europ. i. 102. 46.

Wesm. Hym. Foss. Belg. 61. 10.

Calicurgus fuscus, *St. Farg. Hym.* iii. 412. 22.

Pompilus serripes, *Dahlb. Exercit. Hym.* 61. 3?

Pompilus sepicola, *Smith, Cat. Brit. Hym.* 14. 16.

Female. Length 5–7 lines.—Black; the head shining, delicately punctured and slightly pubescent. Thorax delicately punctured and slightly pubescent; the hinder margin of the pro-

thorax angulated; the metathorax subelongate, with its apical margin reflexed, and very delicately transversely striated; a deep central depression at its base; wings with an irregular fuscous nebulosity, the nervures piceous, those towards the apex of the wings palest; the anterior tarsi slightly spinose; the intermediate tibiæ and the first joint of the tarsi, and also the posterior tarsi, very spinose; the posterior tibiæ serrated. Abdomen shining, with the two basal segments and the basal margin of the third red; the extreme base black; the apical segments pubescent.

Male. Length $3\frac{1}{2}$ – $5\frac{1}{2}$ lines. — Differs in having only a few dispersed spines on the posterior legs; the anterior tibiæ are sometimes ferruginous in front; the apical segment of the abdomen furcate, with a few curled hairs on each side; and the sixth ventral segment with two lateral incisions.

This is not the *Sphex fusca* of Linnæus, as is proved by an examination of the typical specimen in the Linnæan Cabinet: it is named in allusion to its habit of preferring the banks of hedgerows. This is perhaps the most variable in size of any of the British species of the genus. The males are usually much smaller than the females: it preys upon spiders, and is found in all parts of the country.

11. *Pompilus (Priocnemis) sericatus.*

P. ater, argenteo-sericeus; abdominis segmento secundo fascia lata rufa. *Mas.*

Pompilus sericatus, *Shuck. Foss. Hym.* p. 60. 11 ♂.

Priocnemis sericatus, *Dahlb. Hym. Europ.* i. 111. 53.

Male. Length $4\frac{1}{2}$ lines. — Black; the face densely covered with silvery pubescence, which extends a short way towards the vertex on the margin of the eyes; the cheeks covered also with silvery pubescence; the labrum concealed. Thorax: the metathorax obtuse, and having a central longitudinal impression; the collar, metathorax, the sides of the thorax, the mesothorax beneath, the coxæ and legs, densely covered with silvery down; the anterior tarsi simple; the intermediate and posterior tibiæ with a double row of very slight spines. Abdomen: the apical margin of the basal segment piceous, the base of the second of a deep red; the venter, with the margin of the fourth segment, slightly emarginate, and those of the fifth and sixth deeply so, with a small fossulet on each side of the emargination of the sixth; the apical segment pointed.

This species I have not found in the London district; it certainly closely approaches the male of *pectinipes*. I have examined the typical specimen, and am inclined to consider it a variety, or rather a dark, fresh specimen of the male of that species: the emargination of the ventral segments is the same.

12. *Pompilus (Priocnemis) affinis*.

P. ater; abdominis basi rufo-ferrugineo, metathorace irregulariter transverso-rugoso, alis apicibus nigris.

Pompilus affinis, *Van d. Lind. Obs.* i. 67. 34.

Shuck. Foss. Hym. 65. 16.

Priocnemis affinis, *Dahlb. Hym. Europ.* i. 103. 48.

Wesm. Hym. Foss. Belg. 63. 11.

Calicurgus affinis, *St. Farg. Hym.* iii. 413. 23.

Female. Length $4\frac{1}{2}$ –7 lines.—Black, with a few long erect hairs on the vertex, clypeus and cheeks; the face slightly sericeous above the clypeus; the antennæ inserted on each side of a tubercle; the mandibles slightly ferruginous a little before the apex. Thorax: the posterior margin of the prothorax rounded; the metathorax transversely rugose, with a slight longitudinal impression; wings fusco-hyaline, with a dark border at their apical margins, the nervures dark fusco-ferruginous; the anterior tarsi slightly ciliated, the intermediate tibiæ and the basal joint of the tarsi spinose; the posterior tibiæ strongly serrated, with the first joint of the tarsi spinose. Abdomen covered with a fine white silky pile; the first, second, and base of the third segment ferruginous; the apical segment covered with short fulvous pubescence, which is interspersed with long hairs.

The *Male* closely resembles the female, but is smaller, the face is more silvery, and the tibiæ have only a few short spines; the sixth ventral segment is slightly emarginate.

This species is very local, and has not been found near London; it has been captured at Hawley, Hants; at Ripley and Weybridge, Surrey; at Southend, Essex; at Deal, Walmer, and in Norfolk. It is usually met with during August and September.

13. *Pompilus (Priocnemis) exaltatus*.

P. niger; abdominis basi rufo, alis apicibus fuscis, puncto albo.

Spheg gibba, *Scop. Ent. Carn.* 296. 786 (nec *Fabr.*).

Spheg exaltata, *Fabr. Syst. Ent.* 351. 31; *Ent. Syst.* ii. 251. 31.

Vill. Entom. iii. 239. 47.

Rossi, Faun. Etrus. i. 64. 820.

Sphex albomaculata, *Schrank, Ins. Austr.* 383. 775.

Vill. Entom. iii. 249. 80?

Gmelin, Ed. Syst. Nat. 2734. 87.

Pompilus exaltatus, *Fabr. Ent. Syst. Suppl.* 251. 31; *Syst. Piez.* 195. 41.

Panz. Faun. Germ. 86. 10 & 195. 41.

Latr. Hist. Nat. Crust. et Ins. xiii. 281. 3.

St. Farg. & Serv. Encycl. Méth. x. 182. 15.

Spin. Ins. Lig. i. 70. 8.

Van d. Lind. Obs. i. 334. 30.

Shuck. Foss. Hym. 66. 17.

Dahlb. Mon. Pomp. 6. 8; *Exercit. Hym.* 62. 8.

Zett. Ins. Lapp. 438. 6.

Smith, Cat. Brit. Hym. 14. 17.

Priocnemis exaltatus, *Schüdt, Mon. Pomp. Kröy. Tidsskr.* i. 330. 7.

Dahlb. Hym. Europ. i. 113. 55.

Wesm. Hym. Foss. Belg. 53. 3.

Female. Length $2\frac{1}{2}$ – $6\frac{1}{2}$ lines.—Black; the apical half of the mandibles ferruginous. Thorax: the posterior margin of the prothorax angulated; the metathorax with a slight longitudinal impression at the base, at the apex finely transversely rugose; the wings slightly coloured and iridescent, a dark cloud covering the apex of the wing from the base of the marginal cell, with a large hyaline spot beyond the third submarginal cell, sometimes obsolete; the anterior tarsi simple, the intermediate and posterior tibiae serrated on the exterior. Abdomen: the two basal segments and the base of the third red; the apical segment slightly ferruginous.

Male. Length $2\frac{1}{2}$ – $3\frac{1}{2}$ lines.—Very closely resembling the female, with the white spot on the wings usually obsolete; all the tibiae simple, and the sixth ventral segment slightly emarginate.

This species is one of the most abundant; it is found in all parts of this country, and scattered throughout Europe. The male seldom has the white spot on the wings, and in the female it is sometimes obsolete.

14. *Pompilus (Priocnemis) agilis.*

P. niger; abdominis basi rufo; pedibus posticis rubris; alis apicibus fuscis, puncto albo.

Pompilus agilis, *Shuck. Foss. Hym. Append.* 251; var. β . *P. exaltatus*, 67.

Female. Length 3–4 lines.—Black; the scape obscurely ferruginous beneath; the mandibles ferruginous, with their base

black. Thorax: the posterior margin of the prothorax subangular or nearly rounded; the metathorax rather longer than in *P. exaltatus*, the wings as in that species; the posterior femora and tibiæ ferruginous, the base of the former black; the anterior tibiæ ferruginous in front; all the legs have the femora, coxæ and tarsi rufo-fuscous, not black. Abdomen: the two basal segments and the base of the third ferruginous; the apical segments usually with the margins rufo-piceous, the apex ferruginous.

Male. Length $2\frac{1}{2}$ –3 lines.—The male has the legs coloured like those of the other sex, and the wings are without the milk-white spot at their apex, the third submarginal cell sometimes petiolated.

This species very closely resembles the preceding, and might be mistaken for a variety; but the different form of the margin of the prothorax is, I think, conclusive of its specific distinction. It may probably be the *P. obtusiventris* of Schiödte and Dahlbom. It has not occurred near London; its known localities are Erith, Darenth and Birch Woods, Kent; it has also been taken at Harrow.

15. *Pompilus (Priocnemis) notatus.*

P. niger; abdomine basi rufo, alis apicibus fuscis, puncto albo.

Mas.—Antennis thorace paulo longioribus, abdominis segmento secundo supra fascia rubra sæpe obsoleta; pedibus partim nigris, partim rubris.

Sphex notata, Rossi, *Faun. Etrus. Mant.* i. 127. 281 ♂.

Pompilus gutta, Spin. *Ins. Lig.* ii. 40. 35.

Pompilus notatus, Van d. Lind. *Obs.* i. 317. 12 ♂.

Shuck. Foss. Hym. 59. 10.

Steph. Illustr. vii. *Suppl.* p. 13. t. 42. f. 2.

Pompilus femoralis, Dahlb. *Mon. Pomp.* 13. 10 ♂.

Priocnemis notatus, Schiödte, Kröy. *Tidsskr.* i. 327. 2.

Wesm. Hym. Foss. Belg. 54, 55 ♂ ♀.

Priocnemis femoralis, Dahlb. *Hym. Europ.* i. 109. 51 ♂.

Anoplius notatus, St. Farg. *Hym.* iii. 462. 35 ♂.

Female. Length $4\frac{1}{2}$ lines.—Black; the labrum and mandibles ferruginous; an impressed line running from the anterior stemmata to the base of the antennæ. Thorax: the posterior margin of the prothorax angulated; the metathorax very convex behind; wings subhyaline, with a fuscous cloud occupying the marginal, second and third submarginals, and the upper portion of the third discoidal cells, a milk-white spot beyond, and the

apex of the wings narrowly fuscous; that portion of the externo-medial nervure which crosses the base of the first submarginal and second discoidal cells forming a regular curve; the anterior tibiæ ferruginous in front, the intermediate and posterior tibiæ serrated. Abdomen: the two basal segments ferruginous; the apical margins of the following segments rufo-piceous; the extreme apex ferruginous.

Male. Length $3\frac{1}{4}$ lines.—Black; a longitudinal impressed line extending from the anterior ocellus to the base of the antennæ; the antennæ slender, longer than the thorax; the mandibles rufescent at their apex. Thorax slightly pubescent; the metathorax covered with silvery pubescence, most dense at the sides; the tegulæ piceous; the wings iridescent, the nervures black; the coxæ covered with a dense silvery pubescence; the anterior legs have the femora towards their apex within, the tibiæ, and basal joint of the tarsi, ferruginous; the intermediate femora and tibiæ, excepting the base of the former and the knees, and the entire posterior femora, ferruginous. Abdomen: the second segment with a broad ferruginous band at the base; the sixth ventral segment with a slight emargination on each side of its centre, which is slightly produced.

The female of this species very closely resembles that of *P. exaltatus*; but its antennæ are thicker, the vertex is wider behind the eyes, and its posterior margin more rounded; the metathorax is more convex, and its truncation much less oblique; the marginal cell is shorter and wider; the second recurrent nervure is not longer than the third transverso-cubital nervure; the abdomen is wider at its base, and has usually only the two basal segments ferruginous. It is easily distinguished from *P. exaltatus* if the neuration of the wings be examined; in the latter, that portion of the externo-medial cell which crosses the base of the first submarginal and second discoidal cells forms a separate curve at the base of each cell.

This is a very rare species, four examples only, to my knowledge, having been captured previous to the past season of 1858. In the month of June a locality was discovered near Highgate, where seven males and one female were captured; I also took a female at Deal, and a male was taken at Ripley by J. F. Stephens, Esq.

16. *Pompilus (Priocnemis) hyalinatus.*

P. niger; abdomine antice rufo; alis hyalinis, fascia ante apicem fusca. *Fœm.*

P. niger ; prothoracis lineola utrinque lutosa, ano puncto albo, alis hyalinis, femoribus quatuor posticis rufis. *Mas.*

Sphex hyalinata, *Fabr. Ent. Syst.* ii. 212. 56 ♂.

Pompilus hyalinatus, *Fabr. Ent. Syst. Suppl.* 248. 13.

Van. d. Lind. Obs. i. 316. 11.

Shuck. Foss. Hym. 57. 8.

Smith, Cat. Foss. Hym. 123. 13.

Wesm. Hym. Foss. Belg. 50. 1.

Liris hyalinata, *Fabr. Syst. Piez.* 230. 11.

Pompilus fasciatellus, *Spin. Ins. Ligur.* ii. 37. t. 5. f. 22 ♀.

Van d. Lind. Obs. i. 335. 31.

Shuck. Foss. Hym. 67. 18.

Priocnemis hyalinatus, *Schödtle, Mon. Pomp. Kröy. Tidsskr.* i. 46. 11 ♂.

Dahlb. Hym. Europ. i. 94. 44 ♂.

Priocnemis fasciatellus, *Schödtle, Mon. Pomp. Kröy. Tidsskr.* i. 329. 5 ♀.

Dahlb. Hym. Europ. i. 105. 49.

Pompilus calcaratus, *Dahlb. Mon. Pomp.* 14. 21 ; *Exercit. Hym.* 69. 23.

Pompilus maculipennis, *Dahlb. Mon. Pomp.* 6. 7 ; *Exercit. Hym.* 62. 7.

Anoplius bidens, *St. Farg. Hym.* iii. 455. 23 ♂.

Anoplius punctum, *St. Farg. Hym.* iii. 456. 26 ♂, var. ?

Calicurgus fasciatellus, *St. Farg. Hym.* iii. 415. 26 ♀.

Female. Length $4\frac{1}{2}$ lines.—Black ; the tips of the mandibles ferruginous. Thorax gibbous and very short ; the metathorax shining and very delicately punctured, the sides with a little fine silky pile ; the posterior margin of the prothorax rounded ; wings hyaline, their nervures black, with a broad transverse fuscous fascia covering the marginal, the second and third submarginal, and a portion of the third discoidal cell ; another faint stain covers the geniculation of the externo- and transversomedial nervures ; the anterior tarsi very slightly ciliated, and the intermediate and posterior tibiæ strongly serrated. Abdomen with the first, second, and base of the third segment red.

Male. Length 3–4 lines.—Black ; the tips of the mandibles ferruginous ; the antennæ as stout as the anterior tibiæ, and about the length of the thorax. Thorax : the posterior margin of the prothorax arched, and sometimes having on each side a luteous line ; the metathorax covered with a sericeous reflection ; the wings clear hyaline, sometimes with a very faint tinge over the marginal and submarginal cells ; the inside of the anterior tibiæ, the apex of the intermediate, and the major part of the posterior femora towards the apex, ferruginous ; a few slight spines on the posterior tibiæ, all the calcaria white. Ab-

domen : a white spot at the base of the apical segment ; all the ventral segments entire ; the margin of the sixth with two abbreviated impressed parallel lines ; the superior plates of the segments curve much further beneath than in other species.

Having united what have hitherto been considered distinct species, it is necessary to state that they were taken *in coitu* at Camberwell, on the 20th of August, 1843. The species is very local, but has been taken at Ilighgate, Hampstead Heath, Bishop's Wood, Hampstead, and at Fulham.

17. *Pompilus (Priocnemis) variabilis*.

P. niger ; fronte puncto utrinque ad marginem internum oculorum, prothoracis lineola utrinque albidis ; pedibus rufis ; metathorace concolore aut sanguineo ; abdominis macula quinta albida.

Sphex variabilis, *Rossi, Faun. Etrus.* ii. 99.

Sphex variegata, *Fabr. Ent. Syst.* ii. 211. 53 (nec *Lin.*).

Pompilus variegata, *Fabr. Ent. Syst. Supp.* 247. 10.

Panz. Faun. Germ. 77. 12.

Pompilus bipunctatus, *Fabr. Ent. Syst. Supp.* 251. 28 ; *Syst. Piez.* 195. 38.

Panz. Faun. Germ. 72. 8 ; *Krit. Revis.* 2. 119.

Van d. Lind. Obs. 330. 25.

Pompilus decemguttatus, *Jurine, Hym.* i. t. 8.

Pompilus variabilis, *Van d. Lind. Obs.* 57. 21.

Pompilus Fabricii, *Van d. Lind. Obs.* 57. 22.

Priocnemis variegatus, *Dahlb. Hym. Europ.* i. 91. 45.

Calicurgus variabilis, *bipunctatus*, *binotatus*, et *Fabricii* ? *St. Farg.*

Hym. iii. 399. 403. 3. 4. 6. 7.

Priocnemis bipunctatus, *Wesm. Hym. Foss. Belg.* 64. 12.

Anoplius sexpunctatus, *St. Farg. Hym.* iii. 447. 10.

Female. Length 3-5 lines.—Black and shining ; a line on the inner orbit of the eyes and a spot behind them towards the vertex cream-coloured ; the mandibles ferruginous, with their tips black. Thorax : the posterior margin of the prothorax with a line on each side and the tubercles cream-coloured ; the metathorax ferruginous and transversely striated, delicately so at the base, and more strongly towards the apex ; the wings fulvo-hyaline, with a broad fuscous border at the apex of the superior pair, the nervures rufo-testaceous ; the legs ferruginous, with the base of the femora, the apex of the tibiæ, and the tarsi black ; the intermediate and posterior tibiæ serrated outside. Abdomen : the second and third segments with an ovate macula on each side at their basal margins ; the fourth

segment with a transverse abbreviated macula at its base in the middle.

Var. β .—The white markings on the head and prothorax obsolete; the metathorax and anterior legs black.

Var. γ .—The head and legs black, with the anterior tibiæ ferruginous within; the metathorax ferruginous.

Var. δ .—The transverse macula on the fourth segment interrupted or subinterrupted.

Male. Length $3\frac{1}{2}$ lines.—Closely resembles the female; the antennæ a little longer than the thorax; the legs black, with the anterior tibiæ ferruginous; the sixth ventral segment emarginate; the seventh with a longitudinal carina in the centre.

The male is described from the only British specimen which I have seen; probably it varies like the female in colouring, which appears to run into innumerable varieties; the synonymy may therefore be much more extensive than is indicated.

The authority upon which this species is for the first time included in the British fauna, is a specimen which was intermixed with a series of *P. rufipes* in the Cabinet of the British Museum; it is a female, with the metathorax black; the locality attached to the specimen is South Wales, and the species being found throughout Europe renders it pretty certain that the locality is correctly given. Several of the species, which a few years ago were unique in the Museum, have had their claim to being indigenous confirmed.

Div. III.—*The anterior tarsi not ciliated, the intermediate and posterior tibiæ without spines.*—Agenia, Schiödde. Sp. 18–20.

18. *Pompilus (Agenia) bifasciatus.*

P. ater, immaculatus, alis albis, fasciis duabus nigris, metathorace nitido.

Spheg bifasciata, Fabr. Ent. Syst. ii. 212. 58.

Pompilus bifasciatus, Fabr. Ent. Syst. Supp. 248. 16; Syst. Piez. 193. 26.

Panz. Faun. Germ. 86. 11; Krit. Revis. ii. 119.

Latr. Hist. Nat. Crust. et Ins. xiii. 281. 4.

Coqueb. Illustr. i. 20. t. 4. f. 11.

Spin. Ins. Lig. i. 69. 3.

Van d. Lind. Obs. i. 40. 5.

Shuck. Foss. Hym. 52. 3.

Agenia bifasciata, Schiödte, *Mon. Pomp. Kröy. Tidsskr.* i. 323. 2.
Anoplius bifasciata, St. Farg. *Hym.* iii. 459. 30.

Female. Length $3\frac{1}{2}$ –4 lines.—Black and shining; the clypeus with a few rufescent setæ; the tips of the mandibles ferruginous. Thorax: the posterior margin of the prothorax subangulated; the metathorax gibbous, convex, smooth and shining, with a slightly impressed line at its base in the centre, frequently obsolete; the anterior wings hyaline and iridescent, with a narrow transverse dark fascia covering the transverso-medial nerve and the geniculation of the interno-medial; another much wider at the marginal and submarginal cells, which it nearly occupies; the apical margin of the wings with a very narrow dark border, with a more or less distinct milk-white spot beyond the third submarginal cell; the legs simple, or having only a few scattered short hairs. Abdomen very smooth and shining; the apex slightly rufescent; the apical segment covered with long black hairs.

The *Male* has the antennæ as long as the thorax, the fasciæ on the wings paler, and the apical ventral segment pinched into an elevated sharp carina.

This is a rare species; but it has occurred at Coombe Wood, Surrey, and in the New Forest. The male I took at Colney Hatch in 1828, and a female at Hampstead in August 1858.

19. *Pompilus (Agenia) variegatus*.

P. ater, immaculatus; alis albis, fasciis duabus fuscis; metathorace obscuro et crasse punctato seu transverso-rugoso.

Sphex variegata, Linn. *Faun. Suec.* no. 1655; *Syst. Nat.* i. 944. 18; and *Cab. Mus. Linn. Soc.*

Müller, *Prodr. Z. D.* 160.

Villers, *Entom.* iii. 231. 30.

Pompilus hircanus, Fabr. *Ent. Syst. Suppl.* 251. 31; *Syst. Piez.* 195. 40.

Panz. *Faun. Germ.* 87. 21; *Krit. Revis.* ii. 119.

Spin. *Ins. Ligur.* ii. 172. 12.

Jurine, *Hym.* 122.

Dahlb. *Mon. Pomp.* 7. 9.

Zett. *Ins. Lapp.* 439. 8.

Pompilus variegatus, Illig. *Faun. Etrus.* ii. 99. 820.

St. Farg. & Serv. *Ency. Méth.* x. 180. 8.

Van d. Lind. *Obs.* i. 311. 6.

Dahlb. *Exercit. Hym.* 64. 11.

Shuck. *Foss. Hym.* 53. 4.

Agenia variegata, Schiödte, *Mon. Pomp. Kröy. Tidsskr.* i. 322. 1.

Dahlb. Hym. Europ. i. 88. 42.

Anoplus variegatus, St. Farg. *Hym.* iii. 445. 6.

Pogonius variegatus, *Dahlb. Tab. Exam. Synop.* 453.

Wesm. Hym. Foss. Belg. 67. 1.

Female. Length 4 lines.—Black; the head closely and finely punctured, the apex of the mandibles ferruginous; the clypeus and cheeks with a few scattered pale hairs. Thorax finely punctured; the posterior margin of the prothorax arcuate; the metathorax gibbous, transversely rugose and subopaque; the anterior wings with a narrow transverse dark fascia occupying the transverso-medial and the geniculation of the interno-medial nervures, beyond which is a much broader fascia crossing the wing at the marginal and submarginal cells, which it occupies; the apical margin of the wing with a narrow dark border enclosing a milk-white spot; the anterior tarsi with a few short cilia, the intermediate and posterior tibiae with a double row of very short slight spines on the exterior. Abdomen shining and delicately punctured; the two apical segments with scattered long rigid hairs, most dense at the apex.

Male. Length 3 lines.—Black; the head closely and finely punctured, the front very convex, the antennae as long as the thorax. Thorax punctured; the metathorax covered with short silvery pubescence, strongly and closely punctured, with a shallow longitudinal impressed line extending from the base to the apex; the wings subhyaline and iridescent, an indistinct fascia crossing the anterior wings at the marginal cell, beyond which a milky spot is faintly perceptible; the anterior legs, with the knees, apex of the tibiae, and first joint of the tarsi, pale rufo-testaceous; all the calcaria pale testaceous. Abdomen lanceolate, smooth, shining and very delicately punctured; the apical margin of the basal segment slightly depressed; the fifth ventral segment slightly emarginate; the sixth with two deeply impressed lines, each terminating in a deep emargination at the apical margin.

This species is rare in the south of England, but is not uncommon in the north; it has been taken several times, however, at Coombe Wood, where, in 1837, I captured two females; in July 1852, I took ten females and one male, near Wakefield, Yorkshire. This insect prefers wood-sides, where it burrows in banks of light earth. The male described was taken in company with the other sex, and has not been previously found in this country; it is exceedingly active, and difficult to capture.

20. *Pompilus (Agenia) punctum*.

P. niger, immaculatus; abdomine breviter petiolato; tibiis posticis, haud serrulatis. *Fœm.*

P. facie utrinque ad marginem internum oculi lineâ albidâ signatâ, anoque puncto albo. *Mas.*

Sphex punctum, *Fabr. Spec. Ins.* i. 448. 33; *Mant.* i. 276. 39 ♂.

Evania punctum, *Fabr. Ent. Syst.* ii. 194. 6.

Ceropales punctum, *Fabr. Syst. Piez.* 187. 9.

Pompilus punctum, *Panz. Faun. Germ.* 86. 12.

Van d. Lind. Obs. i. 315. 10.

Shuck. Foss. Hym. 56. 7.

Smith, Trans. Ent. Soc. Lond. iii. new ser.

Pompilus petiolatus, *Van d. Lind. Obs.* i. 314. 9 ♀.

Shuck. Foss. Hym. 54. 5.

Agenia carbonaria, *Dahlb. Hym. Europ.* i. 90. 43 ♂ ♀.

Anoplius albigena, *St. Farg. Hym.* iii. 457. 27 ♂.

Anoplius petiolatus, *St. Farg. Hym.* iii. 443. 3 ♀.

Agenia punctum, *Wesm. Hym. Foss. Belg.* 66. 1.

Female. Length 3-5½ lines.—Black; the head closely and delicately punctured, a faint longitudinal impressed line running from the anterior ocellus to the base of the antennæ; the clypeus very convex at the base, slightly produced and pointed in the middle of its anterior margin, and having a few scattered griseous hairs; tips of the mandibles ferruginous. Thorax finely punctured; the metathorax obtuse, delicately transversely rugose, with a slight central impressed line at the base; the tegulæ piceous; the wings slightly coloured and iridescent, the nervures piceous; the anterior tarsi and the intermediate and posterior tibiæ with a few very short slight spines. Abdomen distinctly petiolated, very delicately punctured, and covered with a fine, sericeous changeable pile, except the apical segment, which is glossy, smooth and shining; the apex rufo-testaceous.

Male. Length 4-5 lines.—Black; the head pubescent; the antennæ robust, as long as the thorax; the face with a longitudinal broad white stripe on each side extending across the clypeus, leaving a black central spot, its anterior margin emarginate; the mandibles sometimes with a white spot in the middle. Thorax: a little hoary pubescence at the sides; the metathorax with a thin sericeous down; the wings smoky hyaline, the tegulæ and nervures piceous; the legs simple; the anterior coxæ and femora in front, the tibiæ and tarsi piceous; the coxæ and trochanters with a loose silvery down. Abdomen

black, slightly shining; the first segment narrowed into a long petiole; the seventh with a white spot at the base; the sixth ventral segment emarginate.

In 1853, I bred both sexes of this species from cells constructed of mud, very similar to those formed by the different species of *Pelopæus*. The male is undoubtedly the *P. punctum*, and the female the *P. petiolatus*. Shuckard says, under *P. punctum*, "With the female, which Van d. Linden considered to be *P. petiolatus*, I am unacquainted;" whereas the male which he described as belonging to *P. petiolatus* was only a variety of the true one, which is described above. The white markings on the face are frequently more or less obsolete, and the metathorax is as distinctly transversely striated in the male as in the female. I have, through the kindness of M. Desvignes, who possesses the Shuckardian Collection, compared the specimens of *P. punctum*, and find them undoubtedly the same species as the one described.

This species is very local; but it occurs about London, and has been taken at Canterbury, Bexley, and Birch Wood, Kent. Mr. Westwood has repeatedly taken it in his garden at Hammersmith.

Genus 2. CEROPALES.

Evania, pt., *Fabr. Syst. Ent.* p. 345 (1775).

Ichneumon, pt., *Oliv. Encycl. Méth.* vii. 209 (1789).

Ceropales, *Latr. Hist. Nat. Crust. et Ins.* xiii. 283 (1805).

Pompilus, pt.; *Illig. Ed. Faun. Etrus.* ii. 84. 80.

Head compressed, as wide as the thorax; eyes ovate, lateral; the stemmata in a triangle on the vertex; antennæ filiform in both sexes, inserted in the middle of the anterior part of the face; the labrum exserted. Thorax gibbous; collar transverse, extending laterally to the tegulæ; the scutellum prominent; metathorax inclined; anterior wings with one marginal and four submarginal cells; the first submarginal longer than the second, which is oblong, and receives the first recurrent nervure beyond the middle; the third much narrowed towards the marginal, receiving the second recurrent nervure; the fourth extending to the apex of the wing; the posterior legs very long; the tibiæ slightly spinose, the claws small, and furnished with a large pulvillus. Abdomen ovate; in the female the aculeus exserted.

Of the economy of this genus of *Pompilidæ* nothing appears to be known: they have been considered as parasites of the genus *Pompilus*; but their legs almost destitute of spines, and the absence of cilia on the tarsi, I am inclined to consider indicate a peculiar economy. The species are found in all quarters of the globe, some being remarkable for beauty of colouring, and others for having the posterior legs disproportionately long. The females are readily distinguished from those of the genus *Pompilus* by their having the antennæ porrect, never convolute.

1. *Ceropales maculata*.

C. nigra; thorace maculato; abdominis primo segmento punctis duobus, secundo margine, anoque albis.

Evania maculata, *Fabr. Syst. Ent.* 345. 2; *Ent. Syst.* ii. 193. 2.

Rossi, Faun. Etrus. ii. 84. 799.

Sphex rustica, *Müller, Prodr. Zool. Dan.* 161. 1876.

Ichneumon multicolor, *Fourc. Ent. Par.* ii. 404. 35.

Oliv. Enc. Méth. vii. 209. 17.

Pompilus frontalis, *Panz. Faun. Germ.* 72. 9.

Illig. Ed. Faun. Etrus. ii. 84. 799.

Ceropales maculata, *Latr. Hist. Nat. Crust. et Ins.* xiii. 283. 1.

Fabr. Syst. Piez. 185. 1.

Panz. Krit. Revis. ii. 112.

Spin. Ins. Lig. ii. 171. 5.

Van d. Lind. Obs. i. 347. 3.

Shuck. Foss. Hym. 69. 1.

Dahlb. Hym. Europ. i. 32. 15.

Schiodte, Mon. Pomp. Krøys. Tidsskr. i. 320. 1.

St. Farg. Hym. iii. 465. 1.

Wesm. Hym. Foss. Belg. 26. 1.

Female. Length 3-3½ lines.—Black; a spot on the scape beneath, and a longitudinal cream-coloured line at the inner orbit of the eyes, traversing the clypeus; the clypeus with a silvery pubescence. Thorax: a band on the posterior margin of the prothorax, the post-scutellum, and a spot on each side at the extreme apex of the metathorax, cream-coloured; the metathorax finely granulated, with a slightly impressed line in the middle of its base; the wings subhyaline and iridescent, the nervures piceous, the stigma ferruginous; the legs red, with the coxæ, trochanters, knees, the apex of the tibiæ, and the articulations of the posterior tarsi, black; a stripe on the coxæ cream-coloured. Abdomen: an ovate transverse spot on each side of the first segment, a band at the apical margin of the second, and the fourth and fifth with a central transverse line, cream-coloured.

Male. Length $2\frac{1}{4}$ –3 lines.—The male has the markings more distinct and larger, and the abbreviated band on the fourth segment usually obliterated.

The female varies in its markings: the line on the orbits of the eyes is sometimes abbreviated, not crossing the sides of the clypeus; the legs varying to nearly black; the white spots and bands on the abdomen more or less obliterated in some examples: sometimes the sixth segment is white above.

Not a very abundant species, but widely distributed; it appears about the end of July. It has been taken at Barmouth and Penzance; in North Wales; at Birch Wood, Erith and Gravesend, Kent; at Hawley, Hants; at Ventnor and Shanklin, Isle of Wight; and near Wakefield, Yorkshire. At Lowestoft it is very plentiful, settling on the heads of the Wild Carrot.

2. *Ceropales variegata*.

C. nigra, albo-maculata; abdomine rufo, maculis tribus albis.

Evania variegata, *Fabr. Ent. Syst. Supp.* 241. 2, 3.

Panz. Faun. Germ. 77. 10.

Ceropales variegata, *Latr. Hist. Nat. Crust. et Ins.* xiii. 284. 2.

Fabr. Syst. Piez. 186. 2.

Spin. Ins. Lig. i. 66. 1.

Van d. Lind. Obs. i. 347. 2.

Shuck. Foss. Hym. 71. 2.

Curtis, Brit. Ent. xvi. 756 ♂.

St. Farg. Hym. iii. 466. 2. t. 33. f. 2.

Dahlb. Hym. Europ. i. 31. 14.

Wesm. Hym. Foss. Belg. 27. 2.

Female. Length 3– $3\frac{1}{2}$ lines.—Black; a line on the inner orbit of the eyes crossing the lateral margins of the clypeus, the labrum, a minute spot between the antennæ, and a spot in front of the scape, white. Thorax: a slightly interrupted line on the collar, the tubercles, post-scutellum, and a minute spot at the posterior lateral angles of the metathorax, white; the wings subhyaline and iridescent; the legs red; the anterior coxæ white in front and black behind; the intermediate and posterior coxæ and trochanters, the tips of the posterior femora and tibiæ, and also the tarsi, black; a white line on the outside of the intermediate and posterior coxæ. Abdomen: the two basal segments red; the second with a lunate cream-coloured spot on each side; the apical segment cream-coloured.

Male. Length $2\frac{1}{2}$ lines.—Very closely resembles the female, but differs in having a minute white spot at the base of the

mandibles, and another on the basal joint of the flagellum ; otherwise like the other sex.

This species is extremely rare in this country ; the only specimens known for many years, were taken by Dr. Leach in Devonshire, and placed in the National Collection. Mr. Rudd captured it at Parley Copse, Hants ; in 1844 I captured a female, on the 20th of August, at Weybridge ; and in 1845, also in August, a male at the same locality ; Mr. Grant took a single specimen at the same place in 1854, since which, I am not aware of its having been captured.

Genus 3. APORUS.

Aporus, *Spin. Ins. Lig.* ii. 33. 30.

Head subrotund, a little wider than the thorax ; eyes lateral and ovate ; the stemmata in a triangle on the vertex ; the antennæ inserted forward on the face at the base of the clypeus ; the labrum concealed. Thorax elongate, the prothorax as long as the metathorax ; the wings inserted in the middle at the sides of the thorax ; *the superior wings with one marginal and two submarginal cells ; the marginal cell small ; the first submarginal elongate, twice as long as the second, which is subquadrate, and receives both the recurrent nervures, the first at about one-third from its base, the second uniting with the second transverse cubital nervure ;* legs of moderate length, the anterior tarsi not ciliated. Abdomen elongate-ovate.

From the above characters it will be seen that the species described in Shuckard's Essay does not belong to the genus *Aporus* ; the above characters are those given by Spinola, with some additions : the essential character, the remarkable neuration of the wings, is carefully described by Spinola, as well as the place of their insertion. The insect described by Shuckard I consider to be only a variety of *P. pectinipes* ; I have several times met with it where *P. pectinipes* was plentiful. My opinion also obtains considerable support from the remarks of Shuckard on the *P. pectinipes* (*P. crassicornis* of his Essay) :—"The Rev. C. Bird showed me a remarkable variety of it, captured at Burgfield by S. W. Haslehurst, Esq., of Trinity College, Cambridge, which has upon the left side the *nervures* of *Aporus*." Should my opinion prove incorrect, the species must be referred to the

genus *Evagethes* of St. Fargeau, the species being synonymous with the *Aporus dubius* of Van der Linden.

1. *Aporus unicolor*.

A. ater; abdominis segmentis duobus anterioribus obscure rubris.

Aporus unicolor, *Spin. Ins. Lig.* ii. 33 ♂.

Van d. Lind. Obs. i. 348. 1.

St. Farg. Hym. iii. 389. 2.

Aporus bicolor, *Spin. Ins. Lig.* ii. 34 ♀.

Van d. Lind. Obs. i. 350. 3.

St. Farg. Hym. iii. 388. 1.

Wesm. Hym. Foss. Belg. 43. 1.

Aporus femoralis, *Van d. Lind. Obs.* i. 349. 2.

St. Farg. Hym. iii. 383. 3.

Female. Length $4\frac{1}{2}$ lines.—Black; the head very convex in front, with a slightly impressed line before the anterior stemma, and covered with an obscure sericeous pile; the tips of the mandibles ferruginous. Thorax covered with obscure changeable pile; the metathorax truncate at the apex; wings fuscous, palest at their base, their apex with a broad dark border. Abdomen: the first, second, and sometimes the base of the third segment obscurely ferruginous.

Male. Length $3\frac{1}{2}$ lines.—Smaller than the female, entirely black, and thinly covered with a delicate silky pile; the clypeus covered with silvery pubescence; thorax as long as the abdomen; the sides of the metathorax covered with silvery-white pubescence; the abdomen slightly compressed; the wings hyaline, with their apex faintly clouded.

There is a single specimen in the National Collection, formerly in that of the late J. F. Stephens, Esq. In 1853 I captured two females at Southend, in the beginning of September; both my specimens were taken at the end of the heights beyond the town, on a sloping bank on the shore. I took a third specimen, in August 1858, at Pakefield, near Lowestoft, Suffolk. The description of the male is from a continental specimen.

Fam. 4. Sphegidæ, Leach.

Prothorax: not having the posterior angles prolonged to the base of the wings, narrowed in front, forming a sort of neck. The basal segment of the abdomen narrowed into a long petiole. Mandibles internally dentate.

Genus 1. AMMOPHILA.

Sphex, pt., *Linn. Faun. Suec.* 411 (1761).

Pompilus, pt., *Fabr. Ent. Syst. Supp.* 246 (1798).

Ammophila, Kirby, *Trans. Linn. Soc.* iv. 195 (1798).

Pepsis, pt., *Fabr. Syst. Piez.* 207 (1804).

Psammophila, *Dahlb. Hym. Europ.* i. 10 (1843).

Head suborbiculate, wider than the thorax; the maxillæ and labium longer than the head, reflexed in the middle; eyes large, oval, and distant; the stemmata placed in a triangle on the vertex; antennæ filiform, arcuate in the female, inserted in the middle of the face; mandibles long, slender, tridentate, with the apical tooth acute, forcipate when closed. Thorax ovate; *the anterior wings with one marginal and three submarginal cells; the marginal cell elongate-ovate; the first submarginal longer than the two following, the second receiving the two recurrent nervures, the third small, and much narrowed towards the marginal; legs long and spinose, the anterior tarsi strongly ciliated; the claws bifid. The abdomen petiolated, usually clavate.*

This genus is one of considerable extent, although only three species inhabit Britain; its geographical range is extensive, being not only found in the four quarters of the globe, but in latitudes extending from the frigid to the torrid zones. The habits of the British species are well known. *A. sabulosa* I have frequently observed conveying caterpillars to its burrow, for the food of its larva; having formed the burrow, and a chamber at its extremity, the female conveys a caterpillar into the cell, upon which she deposits and affixes an egg; subsequently she stores up three or four additional ones, and her task is completed; each time that she deposits a caterpillar, she carefully stops up the entrance with a few pebbles: she does not wait until each caterpillar is devoured before supplying another; if uninterrupted by weather or other circumstances, the whole are stored up in a few hours, and she then proceeds to construct a fresh burrow. Shuckard says, "I have never observed these insects convey caterpillars." Having, as above stated, observed *A. sabulosa* with her prey, I may here add, that I have seen this insect with its prey probably fifty times, and always with a caterpillar. *A. viatica* appears as invariably to prey upon spiders; I have never seen it with a caterpillar.

1. *Ammophila sabulosa*.

A. nigra, hirta ; segmento secundo tertioque ferrugineis, petiolo biarticulato.

Sphex sabulosa, Linn. *Faun. Suec.* 411. 1648; *Syst. Nat.* i. 941. 1 ♀.

Scop. Ins. Carn. 770. fig. 770.

Frisch, Ins. ii. t. 1. f. 6, 7, 8.

DeGeer, Ins. ii. 822. 5. t. 28. f. 7.

Fabr. Syst. Ent. 346. 1.

Schrank, Ins. Austr. 377. 768.

Rossi, Faun. Etrus. ii. 60. 808.

Christ. Hym. 311. t. 31. f. 2.

Panz. Faun. Germ. 65. 12.

Ratz. Forst. Ins. Bd. iii. 34. 1. t. 4. f. 10 ♀.

Zett. Ins. Lapp. 435. 1.

Ammophila vulgaris, Kirby, *Trans. Linn. Soc.* iv. 195. 1.

Ammophila sabulosa, Latr. *Nouv. Dict.* ed. 2. i. 450.

Van d. Lind. Obs. i. 85. 2.

Brullé, Hist. Nat. II. Canar. iii. 61.

Shuck. Foss. Hym. 75. 1.

Dahlb. Hym. Europ. i. 9. 10.

St. Farg. Hym. iii. 376. 17.

Wesm. Hym. Foss. Belg. 69. 1.

Ammophila pulvillata, Sow. *Brit. Miscell.* i. 33. t. 33. f. 1 ♂.

Female. Length 10–11 lines.—Black ; the head with scattered punctures ; the clypeus with long fuscous pubescence ; a little is also scattered on the vertex and cheeks. Thorax : the disk shining, with scattered punctures ; the mesothorax with a deeply impressed central longitudinal line ; the metathorax opaque, finely granulated, the sides rather coarsely wrinkled ; the wings subhyaline, the nervures piceous, the apical margins clouded ; the tubercles, an ovate spot beneath the wings, and another on each side of the insertion of the abdomen, covered with silvery pubescence ; the coxa and under side of the mesothorax covered with a fine sericeous pile ; the anterior tarsi strongly ciliated, the intermediate and posterior tibiae spinose. Abdomen clavate ; the second joint of the petiole, except its base, the second segment and base of the third, ferruginous ; the apical segments have a slight blue tinge ; the apex pubescent.

The *Male* differs in being a little smaller, more slender and more pubescent ; the face with a silvery pile ; the legs less spinose ; and the abdomen with a longitudinal black stripe along the top of the second joint of the petiole, and usually continuing along the second segment, but sometimes obsolete.

A very abundant species, found in most sandy situations. On the sand-hills at Deal I have observed both sexes in immense numbers on thistle-heads; it also abounds all along the coast between Deal and Dover.

2. *Ammophila viatica*.

A. nigra, hirsuta; alis fuscis, metathorace rugoso, abdomine antice rufo.

Sphex viatica, Linn. *Faun. Suec.* no. 1651; *Syst. Nat.* i. 943. 15; & *Cab. Mus. Linn. Soc.* ♀.

De Geer, Ins. ii. 152. t. 28. f. 16.

Latr. Hist. Nat. xiii. 293. 2.

Ratz. Forst. Ins. Bd. iii. 34. 2.

Sphex hirsuta, Scop. *Ent. Carn.* 772. fig. 772.

Shrank, Ins. Austr. 380. 769.

Sphex arenaria, Fabr. *Mant.* i. 273. 2.

Rossi, Faun. Etrus. ii. 60. 809.

Panz. Faun. Germ. 65. 13.

Zett. Ins. Lupp. 435. 2.

Pepsis arenaria, Fabr. *Syst. Piez.* 207. 1.

Illig. Ed. Faun. Etrus. ii. 92. 809.

Ammophila argentea, Kirby, *Trans. Linn. Soc.* iv. 198. 4 ♂.

Ammophila hirsuta, Kirby, *Trans. Linn. Soc.* iv. 195. 4 ♀.

Sow. Brit. Miscell. i. t. 33. f. 1.

Van d. Lind. Obs. i. 89. 6.

Shuck. Foss. Hym. 77. 2.

Brullé, Expéd. Sc. de Morée, iii. 369. 812.

St. Farg. Hym. iii. 364. 1.

Lucas, Explo. Sc. Algér. iii. 274.

Psammophila viatica, Dahlb. *Hym. Europ.* i. 18. 12.

Wesm. Hym. Foss. Belg. 69. 1.

Female. Length 9-10½ lines.—Black; the head and thorax coarsely punctured and covered with a thick black pubescence; the scutellum shining, the punctures distant; wings subhyaline, with a broad fuscous border at their apex; the anterior tarsi strongly ciliated; the posterior tibiae with a brown velvety pubescence within. Abdomen ovate, shining; the first, second, and base of the third segment ferruginous; the apex with a few rigid black setae; the petiole black.

The *Male* differs in having the pubescence griseous, and the face covered with silvery pubescence; the legs less spinose, and covered with sericeous pile; the abdomen clavate, and covered with silky white pile; the petiole a little longer, and only the posterior margin of the third segment black.

This is a very abundant species, frequenting most sandy situations. I have frequently found, in digging in sand-banks, as many as twenty females, apparently hybernating together until suitable weather enabled them to pursue their usual economy.

3. *Ammophila lutaria*.

A. nigra; metathorace transverso seu oblique striato, abdominis basi rufo.

Sphex lutaria, *Fabr. Mant.* i. 273. 3; *Ent. Syst.* ii. 199. 3 ♂.

Villers, Ent. iii. 225. 17.

Pepsis lutaria, *Fabr. Syst. Piez.* 208. 2.

Ammophila affinis, *Kirby, Trans. Linn. Soc.* iv. 195. 2 ♂ ♀.

Van d. Lind. Obs. i. 87. 5.

Shuck. Foss. Hym. 78. 3.

St. Farg. Hym. iii. 369. 8.

Lucas, Explo. Sc. Algér. iii. 274.

Psammophila affinis, *Dahlb. Hym. Europ.* i. 16. 11.

Wesm. Hym. Foss. Belg. 70. 2.

Female. Length 9–10½ lines.—Black; the head and thorax punctured and pubescent; the disk of the thorax shining; the mesothorax with a deeply impressed line at its base, extending to the middle of its disk; the metathorax above transversely striated, with an impressed longitudinal line in the middle, terminating in a fossulet at the verge of the truncation; the wings hyaline, their apical margins slightly clouded; the anterior tarsi strongly ciliated, and all the tibiæ spinose. Abdomen: the petiole and base of the first segment black, the posterior portion and the second and third segments ferruginous, the apical margin of the third usually black.

Male.—Differs in having the face covered with a dense silvery pubescence; the abdomen has a bright silky white pile, and the legs have a thin changeable pile; the basal segment is sometimes entirely black; the abdomen clavate.

This is a very local insect: it occurs sparingly at Southend in August and September; I found it, however, plentifully on the sands at Deal. It has also been taken at Littlehampton, Sussex, and on the coast of Hampshire. It appears to prefer sandy spots near the sea. It has not occurred in the north of England. At Lowestoft, Suffolk, it is very plentiful.

Genus 2. MISCUS.

Miscus, *Jurine, Hym.* i. 130 (1807).

Ammophila, pt., *Latr. Gen. Crust. et Ins.* iv. (1809).

The characters of this genus are precisely those of *Ammophila*, with the exception of the anterior wings having the third submarginal cell petiolated.

1. *Miscus campestris*.

M. niger; metathorace in medio depresso et a latere oblique striato; abdominis segmento secundo et tertio ferrugineis.

Ammophila campestris, *Latr. Nouv. Dict.* i. 450.

St. Farg. Ency. Méth. x. 453. 3.

Curtis, Brit. Ent. xiii. t. 464 ♀.

Miscus campestris, *Van d. Lind. Obs.* i. 92 ♂ ♀.

Shuck. Foss. Hym. 80. 1.

St. Farg. Hym. iii. 386. 1. t. 30. f. 5.

Dahlb. Hym. Europ. i. 7. 9.

Steph. Illustr. Mand. vii. Supp. 15. t. 41. f. 4.

Wesm. Hym. Foss. Belg. 70. 1.

Female. Length 7-8½ lines.—Black; head finely punctured and pubescent; an impressed line in front of the anterior stemma extending to the insertion of the antennæ. Thorax transversely and finely striated on the disk, intermixed with distinct punctures in the middle, in front a longitudinal impressed line terminating in the middle of the disk; the metathorax with a shield-shaped space above, which is obliquely striated on each side from the centre; the sides and apex densely covered with sericeous pile; the hinder margin of the tubercles, a patch on each side of the pectus, and another on each side of the insertion of the abdomen, of silvery pubescence; the wings fusco-hyaline, the nervures black; the anterior tarsi ciliated, the legs spinose. Abdomen: the first and base of the second joint of the petiole black, the remainder red, the second segment and base of the third red.

The *Male* differs in having the face, below the antennæ, densely covered with silvery pubescence; the petiole black above, and having a black patch on the first segment; sometimes entirely black above.

This insect in habit is an *Ammophila*, the only difference between it and that genus being the petiolated third submarginal cell; whether this be regarded as of generic value or not, it forms a very distinct and convenient division of an extensive section of fossorial insects: a third division is made by *St. Far-*

geau, who established the genus *Coloptera* for their reception; the latter have only two submarginal cells in the anterior wings: this genus is African. Only two species are at present known, and the same number form the genus *Miscus*; the second species is from North China. I possess a specimen of *M. campestris*, in which the third submarginal cell is triangular, thus resembling some varieties of *A. sabulosa*; but it can only be regarded as a rare occurrence. *M. campestris* is a very local insect, and is recorded as having been taken in Dorsetshire and in the New Forest; it is not uncommon at Hawley Flat, Hants, in the month of August, and at Weybridge it is extremely abundant. It provisions its nest with the larvæ of Lepidoptera.

Genus 3. SPHEX.

Head large, transverse, as wide as the thorax; eyes large and ovate; antennæ filiform, inserted near the base of the clypeus; mandibles large and arcuate. Thorax ovate; the prothorax transverse, and constricted in front into a sort of neck; the scutellum transverse; the metathorax truncated or rounded posteriorly; the anterior wings with one marginal and three submarginal cells; the marginal cell long, narrow, and rounded at its apex; the first submarginal as long as the two following; the second oblique-quadrate, receiving the first recurrent nervure towards its apex; the third forming a truncated triangle, with its posterior margin usually rounded, receiving the second recurrent nervure in the middle; the legs moderately long and stout; the anterior tarsi of the females ciliated, the intermediate and posterior tibiæ spinose. Abdomen ovate-conical, petiolated, the petiole formed of the basal half of the first segment.

1. *Sphex flavipennis*.

S. nigra; fronte aurea, abdomine rufo, petiolo apiceque atris, tarsis ferrugineis.

Sphex flavipennis, *Fabr. Ent. Syst.* ii. 201. 10.

Latr. Hist. Nat. Ins. xiii. 293. 3.

Jurine, Hym. t. 29. t. 8. gen. 5.

Van d. Lind. Obs. i. 94. 1.

Shuck. Foss. Hym. 83. 1.

St. Farg. Hym. iii. 349. 23.

Steph. Illustr. Mand. vii. *Supp.* 14. t. 41. f. 3.

Pepsis flavipennis, *Fabr. Syst. Piez.* 210. 13.

Female. Length $7\frac{1}{2}$ – $9\frac{1}{2}$ lines.—Black and shining, covered with a thin, loose, hoary pubescence; the base of the mandibles ferruginous, their apex piceous; the face covered with aurichalceous pubescence. Thorax covered with long, thin, hoary pubescence, the disk punctured; the metathorax opaque; the anterior tibiae in front and all the tarsi ferruginous, the basal joint of the posterior pair usually black; the anterior tarsi ciliated, the intermediate and posterior pairs, as well as the tibiae, spinose. Abdomen: the petiole and base of the first segment black; the remainder, as well as the second segment and the greater portion of the third, ferruginous.

This insect is included in the British list with much doubt of its being indigenous. The only specimen is in the National Museum: it was formerly in the possession of the late J. F. Stephens, who did not know its locality. The species does not occur near Paris, but in the south of France and Italy is of common occurrence.

Genus 4. DOLICHURUS.

Pompilus, pt., *Spin. Ins. Lig.* ii. 52. 41 (1806).

Pison, pt., *Latr. Gen. Crust. et Ins.* iv. 58 (1809).

Dolichurus, *Latr. Gen. Crust. et Ins.* iv. 387 (1809).

Head subglobose, as wide as the thorax; the eyes large, lateral and ovate; the stemmata placed in a triangle forwards on the vertex; antennae filiform, inserted on a tubercle at the base of the clypeus; the clypeus transverse; the labrum concealed; mandibles long, narrow, and arcuate, their apex acute and dentate within. Thorax ovate; the prothorax transversosquare posteriorly, narrowed into a neck anteriorly; the mesothorax short, not extending beyond the posterior margin of the tegulae; the scutellum semicircular and flat; *the anterior wings with one marginal and three submarginal cells, a fourth faintly traced; the marginal cell long, and acute at the apex; the first submarginal cell about the same length as the second, its apical nervure emitting in the middle a short nervure or branch inwardly; the second and third submarginal cells narrowed towards the marginal, the second receiving the first recurrent nervure in the middle, the third receiving the second recurrent nervure near its base;* the legs simple. The abdomen conical, attached to the thorax by a broad, short, flat petiole; the two basal segments

with their margins constricted; the terminal segment emits at its apex a valvular process, obtuse at the end, from which the sting is exerted.

1. *Dolichurus corniculus*.

D. ater, nitidus, immaculatus.

Pompilus corniculus, *Spin. Ins. Lig.* ii. 52. 41.

Pison ater, *Latr. Gen. Crust. et Ins.* iv. 58.

Dolichurus ater, *Latr. Gen. Crust. et Ins.* iv. 387.

Van d. Lind. Obs. i. 95. 1.

Dahlb. Hym. Europ. i. 57. 1.

Dolichurus corniculus, *St. Farg. Encycl. Méth.* x. 450; *Hym.* iii. 327. 1.

Shuck. Foss. Hym. 85. 1.

Dahlb. Hym. Europ. i. 29. 13.

Steph. Illustr. Mand. Supp. vii. 14. t. 42. f. 1.

Wesm. Hym. Foss. Belg. 70. 1.

Female. Length $4\frac{1}{2}$ lines.—Black and shining; the head strongly punctured, the tubercle in the middle of the face concave above; the clypeus with a raised sharp carina in the middle. Thorax strongly punctured; mesothorax with two impressed longitudinal lines on each side, the inner one longest; the superior surface of the metathorax enclosed by an elevated line, forming a truncated triangle, with three carinæ in the middle of its base, between which and at the sides it is transversely wrinkled; the wings subhyaline, the nervures and tegulæ rufo-piceous; the joints of the legs rufo-piceous; the tibiæ and tarsi sometimes obscurely rufo-piceous. Abdomen very smooth and shining; the apical margins of the segments and the apex rufo-piceous.

The *Male* is rather smaller, and has a pale spot on each side of the clypeus; the mandibles ferruginous; the antennæ and legs rufo-piceous; the wings iridescent, and the abdomen closely punctured.

Although this species is found throughout Europe, and is not a scarce insect in Denmark, Sweden, or Finland, it has only occurred once in this country. Both sexes were taken by Dr. Leach, in Devonshire, some years ago. These specimens are in the British cabinet of the National Collection.

Fam. 5. Larridæ, Leach.

The mandibles emarginate exteriorly towards their base; the anterior and intermediate tibiæ with a single spine at their apex, the posterior pair with two spines.

Genus 1. TACHYTES.

Larra, pt., *Fabr. Ent. Syst.* ii, 220 (1793).

Pompilus, pt., *Fabr. Syst. Piez.* 187 (1804).

Tachytes, *Panz. Krit. Revts.* ii. (1806).

Liris, *Illig. Ed. Faun. Etrus.* (1807).

Lyrops, *Illig. Ed. Faun. Etrus.* (1807).

Head transverse, wider than the thorax; the eyes converging at the vertex; the posterior stemmata obsolete; the mandibles large, arcuate and acuminate, bidentate within, deeply emarginate on the exterior towards their base, forming a dentate process. Thorax ovate; the metathorax short, rounded at the sides, gradually inclined above, as broad as long; the anterior wing with one marginal cell, more or less acuminate at the apex, not truncated, and three submarginal cells, the second receiving both recurrent nervures. Abdomen short, ovate-lanceolate, subsessile, not longer than the thorax, usually subdepressed above; the apical segment with the disk flat, the margins reflexed, the apex acute.

1. *Tachytes pompiliformis*.

T. niger; abdominis basi rufo.

Larra pompiliformis, *Panz. Faun. Germ.* 89. 13.

Spin. Ins. Lig. 173. 18 ♂.

Larra dimidiata, *Panz. Faun. Germ.* 106. 13 ♀.

Tachytes pompiliformis, *Van d. Lind. Obs.* ii. 21. 5 ♀.

Shuck. Foss. Hym. 89. 1.

St. Farg. Hym. iii. 252. 15.

Wesm. Hym. Foss. Belg. 72. 1.

Tachytes pectinipes, *Dahlb. Hym. Europ.* 127. 63?

Female. Length $3\frac{1}{4}$ – $4\frac{1}{2}$ lines.—Black; a deep depression behind the tubercle, which occupies the situation of the posterior stemmata; the interior margin of the eyes and the clypeus covered with a silvery-white pubescence; the apex of the mandibles ferruginous. Thorax slightly shining, very closely and finely punctured; the metathorax finely granulated; the truncation transversely striated, with a deep fossulet in the centre

of its base; the wings slightly fuscous, the nervures piceous; the anterior tarsi strongly ciliated on the outside; the intermediate and posterior pairs with strong spines at the apex of the joints; the tibiae with scattered spines, the apical joints of the tarsi ferruginous. Abdomen: the first, second, and base of the third segment ferruginous; the margins of the segments slightly depressed, obscurely covered with silvery pile, which is most visible at the sides.

β. The three basal segments of the abdomen ferruginous.

The *Male* is rather smaller; the abdomen more elongate, and with rarely more than the two basal segments ferruginous; the legs are less spinose.

This insect is very abundant in most sandy situations; it has been taken at Southend, Deal, and in North Wales; in Sandown Bay, Luccomb Chine, and Ventnor, Isle of Wight, plentifully at the end of July; it has also occurred at Yarm, in Yorkshire. Its prey appears to be various: Shuckard says that he frequently caught it with sandy-coloured caterpillars on Hampstead Heath; I have taken it at Weybridge with a small species of grasshopper. At page 88 of Shuckard's Essay, he has recorded the capture of *Larra anathema* in Ireland, by Mr. Haliday, who has since informed me that the insect in reality was *Tachytes pompiliformis*, the wrong name having inadvertently been entered in his list.

Larra anathema is omitted in this work, being in all probability introduced into the British fauna by mistake, as the insect, I am informed, does not occur nearer than the south of France.

2. *Tachytes unicolor*.

T. ater, immaculatus; abdominis segmentorum marginibus lucidis.

Larra unicolor, Panz. Faun. Germ. 106. 16.

Tachytes unicolor, Shuck. Foss. Hym. 90. 2.

Dahlb. Hym. Europ. i. 129. 65.

St. Farg. Hym. iii. 240. 1.

Lucas, Explor. Sc. Algér. iii. 246.

Wesm. Hym. Foss. Belg. 72. 2.

Female. Length $4\frac{1}{2}$ lines.—Black; the head closely punctured, an impressed line extending from the anterior stemma to the base of the antennæ, and another passing backwards from the tubercle which replaces the posterior stemmata to the margin

of the vertex; the face with a thin, silky, silvery-white pubescence; the tips of the mandibles ferruginous. Thorax: the disk shining, evenly but not so closely punctured as the head; the metathorax opaque, and longitudinally striated above, the truncation striated transversely; the wings slightly coloured and iridescent, the nervures and tegulæ rufo-testaceous; the apical joints of the tarsi rufo-testaceous, the anterior pair ciliated; the intermediate and posterior pair with a double row of spines on the outside. Abdomen closely and delicately punctured; the margins of the segments depressed, and having at the sides an obscure silvery pile; the apex acute.

Male very closely resembling the female, but with a dense silvery pubescence on the face; the metathorax more pubescent, and the tarsi redder; the abdomen more elongate.

This is a rare and very local species. I have twice taken specimens at Sandhurst, Berks, in the beginning of June, also at Weybridge in July, and both sexes in Sandown Bay, Isle of Wight, during the third week of July; it is an extremely active insect, flying with amazing rapidity, and is difficult to capture; it is also found on the sand-hills at Deal.

Genus 2. MISCOPHUS.

Miscophus, Jurine, *Hym.* 206 (1807).

Larra, pt., *Panz. Faun. Germ.* 106 (1808).

Head rather wider than the thorax, subquadrate above; eyes ovate, distant; the stemmata in a triangle on the vertex, each sunk in a fossulet, rather wide apart; the antennæ filiform, inserted at the base of the clypeus; the clypeus transverse; the labrum concealed; the mandibles unidentate, tuberculate within, abruptly widened near their base, the angle of the widened part produced into a strong tooth. Thorax ovate, posteriorly truncate; *the anterior wings with one marginal and two submarginal cells; the marginal cell small and subovate; the first submarginal receiving the first recurrent nervure near its apex; the second submarginal, which is triangular and petiolated, receives the second recurrent nervure near its apex;* the legs slightly spinose, the anterior tarsi ciliated outside. Abdomen subovate and subsessile, the apex acute.

1. *Miscophus bicolor*.

M. niger; abdominis basi rufo.

Miscophus bicolor, *Jurine, Hym.* 206. t. 11. gen. 25 ♀.

Latr. Gen. Crust. et Ins. iv. 72.

Guér. Dict. Class. Hist. Nat. x. 632.

Van d. Lind. Obs. ii. 25. 1.

Shuck. Foss. Hym. 92. 1.

Smith, Zool. ii. 699 ♂ ♀.

Dahlb. Hym. Europ. i. 235. 135 ♀.

St. Farg. Hym. iii. 237. i. t. 27. f. 6.

Steph. Illustr. Mand. Supp. vii. 12. t. 42. f. 3 ♀.

Wesm. Hym. Foss. Belg. 72. 1.

Female. Length 3 lines.—Black; the head closely and delicately punctured; the mandibles ferruginous. Thorax finely punctured, shining on the disk; the metathorax opaque, depressed above, with a series of divergent striæ at the base, the truncation transversely striated; the wings slightly coloured, their apical margins with a darker cloud; the legs dark rufopiceous. Abdomen shining and delicately punctured, the two basal segments ferruginous; the apical margins of the segments slightly depressed.

Var. β. The apical margin of the second segment of the abdomen black.

Var. γ. The apical half of the second segment black.

Male. Length $2\frac{1}{2}$ lines.—Black; the antennæ rufopiceous beneath; the mandibles ferruginous; the legs simple; sculptured like the female.

Miscophus bicolor is a very rare and local insect; it used to be occasionally taken at Coombe Wood, where I captured it in 1835; subsequently it occurred at Sandhurst, Berks. At Weybridge I took both sexes, the male not having been previously taken in this country; of that sex I took seven specimens, all entirely black; on the Continent the male has sometimes more or less red at the base of the abdomen: it provisions its nest with a small white-bodied spider, which is found commonly on Heath; I captured several females with this prey.

2. *Miscophus maritimus*.

M. niger; capite thoraceque nigro-æneis, alis apicis fuscis.

Female. Length $2\frac{1}{2}$ – $2\frac{3}{4}$ lines.—Black; the head and thorax shining, and with a slight brassy tinge, closely and finely punctured.

tured; the front with an impressed line running from the anterior stemma to the insertion of the antennæ. Thorax: an impressed line in the middle of the collar continued on the mesothorax faintly, nearly to the middle of its disk; the metathorax black, and having a central longitudinal impressed line, which runs into a deep fossulet at the verge of the truncation, which is coarsely striated transversely, the base of the metathorax with some oblique irregular striæ; the wings fuscohyaline, with their apical margins clouded. Abdomen shining, very delicately punctured, the apical margins of the first and second segments slightly depressed.

Male. Length 2-2½ lines.—Differs from the female only in having a little silvery pubescence on the face, and the metathorax with cinereous scattered pubescence; the thorax sometimes more brassy.

This insect I at first thought might be the *M. spurius* of Dahlbom, but on more mature consideration I think it is certainly undescribed: the conspicuous brassy tinge on the head and thorax at once distinguishes it. Independent of the difference of colour, it differs from *M. bicolor* in having the metathorax proportionably longer, and it is also a larger insect: all Dahlbom's black species, *M. niger*, *concolor*, and *spurius*, are even smaller than *M. bicolor*. I discovered this species in 1856, in the beginning of August, on the sand-hills at Sandown near Deal; the following season I again met with it in the same locality, having taken a dozen examples, all agreeing in size and colouring: I may add, that I do not consider size alone of much specific value.

Genus 3. DINETUS.

Crabro, pt., *Fabr. Ent. Syst.* ii. 293 (1793).

Sphex, pt., *Fabr. Ent. Syst.* ii. 198 (1793).

Pompilus, pt., *Fabr. Syst. Piez.* 187 (1804).

Larra, pt., *Latr. Hist. Nat. Ins.* xiii. 296 (1805).

Dinetus, *Jurine, Hym.* 209 (1807).

Head transverse, as wide as the thorax; eyes ovate, converging at the vertex; stemmata in a triangle; antennæ filiform in the female, the scape incrassate, with a deep lateral impression; the apical joints convolute and covered with silvery pubescence; the clypeus convex, transverse, and rounded in front; mandibles tridentate, emarginate on the exterior towards their base. Thorax ovate; the collar and scutellum transverse; the

metathorax truncate posteriorly; the anterior wings with one marginal and two submarginal cells; the marginal cell truncated at the apex, and emitting a nervure from the lower angle of the truncation, which runs up to the margin of the wing, tracing a second marginal cell; the first submarginal cell oblong, receiving the first recurrent nervure at its apex; the second small and triangular, receiving the second recurrent nervure; the anterior tarsi ciliated; the abdomen ovate and subsessile.

1. *Dinetus pictus*.

D. niger; thorace maculato, abdomine ferrugineo, fasciis tribus flavis, ano nigricante. *Fæm.*

D. fronte flava, antennis cochleatim retortis. Mas.

Sphex gutta, *Fabr. Ent. Syst.* ii. 215. 72 ♀.

Crabro pictus, *Fabr. Ent. Syst.* ii. 299. 20 ♂.

Panz. Faun. Germ. 17. 19 ♂, 72. 10 ♀.

Crabro ceraunius, *Rossi, Mant. Append.* 123. 11.

Pompilus guttatus, *Fabr. Ent. Syst. Supp.* 252. 34 ♀; *Syst. Piez.* 196. 44.

Lara picta, *Latr. Hist. Nat.* xiii. 296 ♂.

Spin. Ins. Lig. i. 73. 4.

Dinetus pictus, *Jurine, Hym.* 209. t. 11. gen. 26 ♀.

Latr. Gen. Crust. et Ins. iv. 73 ♂ ♀.

Guér. Dict. Class. Hist. Nat. ix. 496.

Panz. Krit. Revis. ii. 193.

Van d. Lind. Obs. ii. 26. 1.

Shuck. Foss. Hym. 94. 1.

Dahlb. Hym. Europ. i. 232. 134.

Guér. Icon. Règ. Anim. t. 70. f. 10.

Steph. Illustr. Mand. vii. *Supp.* 12. t. 42. f. 3.

Wesm. Hym. Foss. Belg. 73. 1.

Female. Length $3\frac{1}{2}$ lines.—Black; the base of the mandibles and a line behind the eyes yellow; the face and clypeus covered with silvery pubescence. Thorax: an interrupted line on the collar, the tubercles, and a transverse line on the scutellum, yellow; the metathorax with a slight central longitudinal impression terminating in a fossulet, with oblique striæ on each side of it, its superior surface and sides covered with a dense silvery pubescence converging at the extremity, and enclosing the superficies of the metathorax at the apex; the wings iridescent and slightly coloured, the nervures piceous; the apex of the anterior femora, and the exterior of all the tibiæ, yellow; the tarsi rufo-testaceous, the basal joints of the intermediate

and posterior pairs somewhat darker; the anterior tarsi strongly ciliated outside, and all the legs spinose. Abdomen: the three basal segments rufescent, the second and third having on their posterior margins on each side a transverse ovate yellow spot; the margins of the fifth and sixth segments yellow.

Male. Length $3\frac{1}{2}$ lines.—The head yellow, with the vertex black, which descends on the face in an angular form, and encloses the stemmata; the scape yellow in front, the flagellum fulvous beneath; the collar, tubercles, and a spot behind them, the tegulæ, scutellum, and a minute spot at its anterior angles, the post-scutellum and legs, yellow; the intermediate coxæ and trochanters, the intermediate femora beneath, and the posterior pair except their apex, rufo-testaceous; the wings slightly coloured and iridescent. Abdomen: the three basal segments yellow, with their margins ferruginous; the fourth segment and base of the fifth black, with a yellow spot on each side on the apical margin of the former; beneath piceous.

This is an extremely rare insect; it is recorded as having been taken near Windsor; I once captured a male near the Ascot Race-course, and have collected in that neighbourhood frequently since, but no second example has occurred.

Genus 4. ASTATA.

Sphex, pt., *Schrank, Ins. Austr.* 777 (1781).

Astata, *Latr. Préc. Car. Ins.* (1796),

Larra, *Don. Brit. Ins.* xii. 73 (1795–1805).

Dimorpha, *Jurine, Hym.* 146 (1807).

Head wider than the thorax, compressed; eyes large, ovate, converging in the female, uniting in the male; stemmata placed in a triangle forward on the vertex; antennæ filiform, inserted at the base of the clypeus, arcuate in the female, porrect in the male; the clypeus transverse, slightly reflexed and truncate in front; mandibles slightly arcuate, bidentate, the apical tooth acute. Thorax ovate; the collar transverse; the metathorax truncated; the anterior wings with one marginal and three submarginal cells, the marginal cell appendiculated and truncated at its apex; the first submarginal narrow, longitudinal, divided obliquely about its centre by an obsolete nervure that runs from the base of the stigma to the middle of the first transverso-cubital nervure; the second triangular, receiving the two recurrent ner-

vures; the third oblique; the wings broad and ample; the legs spinose. Abdomen subsessile, conical, the upper surface flattened in the male.

1. *Astata boops*.

A. atra; abdominis basi rufo, metathorace reticulato.

Sphex boops, Schrank, *Ins. Austr.* 384. 777.

Rossi, *Faun. Etrus. Mant.* 128. 284.

Tiphia abdominalis, Panz. *Faun. Germ.* 53. 5.

Larra pompiliformis, Don. *Brit. Ins.* xii. 73. 420.

Astata abdominalis, Latr. *Hist. Nat.* xiii. 297. 1.

Astata boops, Van d. Lind. *Obs.* ii. 27. 1 ♂ ♀.

Shuck. *Foss. Hym.* 97. 1.

Dahlb. *Hym. Europ.* i. 140. 72.

Guér. *Icon. Règ. Anim.* t. 71. 1.

St. Farg. *Hym.* iii. 256. 1. t. 21. f. 2.

Lucas, *Explo. Sc. Algér.* iii. 260. t. 12. f. 7.

Wesm. *Hym. Foss. Belg.* 73. 1.

Astata victor, Curtis, *Brit. Ent.* vi. t. 261 ♀.

Astata Vanderlindenii, Rob. Mag. *Zool. Guér.* t. 76.

Female. Length 5-6 lines.—Black; the head shining, the face closely punctured, the vertex with only a few scattered delicate punctures; a short smooth impressed line in front of the anterior stemma; the face with a little griseous pubescence; the mandibles ferruginous a little before the apex. Thorax: the mesothorax and scutellum smooth and shining, the former closely punctured in front; the metathorax reticulated; wings subhyaline, with a broad dark band at the apex of the submarginal cells, the apex of the wings paler; the legs robust, slightly pubescent, very spinose; the anterior tarsi strongly ciliated. Abdomen subsessile, somewhat conical; the margins depressed, the first, second, and base of the third segment ferruginous.

Var. β. Only the extreme apical margin of the third segment black.

Male. Length 4-6 lines.—Differs in having the face and checks covered with long silvery-white pubescence, most dense on the former; the eyes red; the mesothorax entirely punctured, the scutellum only smooth and shining; the anterior tarsi not ciliated; the legs much less spinose; wings subhyaline, clear hyaline beyond the submarginal cells; the sides of the thorax, the apex, and the base of the abdomen with long thin hoary pubescence.

Var. β. The wings entirely hyaline.

This insect is extremely local; but it is found on Hampstead Heath, towards the west corner, amongst the sand-pits; here it abounds about the end of July and during August; I have also taken it at Coombe Wood, and at Hawley, Hants. Its usual prey appears to be the larva of a *Pentatoma*; about five is the number usually stored up in a cell; on several occasions I have also captured it conveying a specimen of *Oxybelus uniglumis*. Shuckard has stated, on my authority, that it also preys upon *Epeolus variegatus*; I have little doubt now that I was mistaken in supposing it to be *Epeolus*; probably it was an *Oxybelus*; *Epeolus* does not occur on Hampstead Heath. The female burrows in hard trodden sand, to the depth of four or five inches. Mr. Curtis took the species in the Isle of Wight, and Mr. Westwood found it at Coombe Wood; and last season, in June, I took the species on Reigate Common; it is very plentiful on Corton Common, north of the town of Lowestoft.

2. *Astata stigma*.

A. atra; abdominis basi rufo, metathorace punctato.

Dimorpha stigma, Panz. *Faun. Germ.* 107. 13.

Larra pinguis, Zett. *Ins. Lapp.* 436.

Astata stigma, Van d. Lind. *Obs.* ii. 29. 4.

Dahlb. Hym. Europ. 139. 69.

Astata jaculator, Smith, *Zool.* iv. 1157.

Female. Length 3 lines.—Black; the face opaque, the vertex shining; the mandibles obscurely rufo-piceous. Thorax: the mesothorax, scutellum, and post-scutellum smooth and shining; an impressed abbreviated line on each side of the mesothorax over the tegulæ; the metathorax opaque, the truncation punctured; wings slightly coloured, their apical margins with a broad fuscous cloud; the marginal cell short and broadly truncated at the apex; the anterior tibiæ more or less ferruginous in front; anterior tarsi ciliated outside; all the tibiæ and tarsi spinose. Abdomen: the first, second, and base of the third segment ferruginous; the margins of the segments depressed; sometimes only the two basal segments red, the second with a central black stain.

The male of this species has not yet been captured in this country; I think it must be the *A. stigma* of the Continent: the British specimens are smaller than any I have received from abroad; they are less pubescent, and the mesothorax less punctured: the capture of the male will decide the question. The

male of *A. stigma* is distinguished by a curved or lunate cream-coloured spot on the front of the head, below the anterior stemma. Only three examples have been captured in England: the first I took at Weybridge on the 22nd of August, 1845, the others at Deal during the first week of September 1855. I have received the species from Finland from Dr. Nylander.

Fam. 6. Nyssonidæ, Leach.

Mandibles not emarginate beneath; the legs subspinose.

Genus 1. NYSSON.

Crabro, pt., *Fabr. Syst. Ent.* 373 (1775).

Nysson, *Latr. Préc. Char. des Ins.* 125 (1797).

Mellinus, pt., *Panz. Faun. Germ.* 72. 13.

Ceropales, pt., *Fabr. Syst. Piez.* 185 (1804).

Head transverse, not wider than the thorax; eyes ovate; stemmata in a triangle on the vertex; antennæ inserted at the base of the clypeus, slightly thickened towards the apex, the scape short and obconic; the clypeus transverse, rounded anteriorly; mandibles arcuate, unidentate, and acute at their apex. Thorax ovate; the collar and scutellum transverse; the metathorax inclined, with a spine on each side; *the anterior wings with one marginal and three submarginal cells; the marginal cell elongate, extending beyond the submarginal cells; the first submarginal longer than the two following united, the second petiolated and receiving the two recurrent nervures, the third about the width of the second and much narrowed towards the marginal.* The legs slender, simple, and slightly pubescent. Abdomen subsessile, ovato-conic, the apex more or less incurved, acute in the females, furcate in the males; the second ventral segment suddenly produced, forming an obtuse angle.

1. Nysson spinosus.

N. niger; antennis prope thoracis longitudinem, abdomine fasciis tribus flavis.

Crabro spinosus, *Fabr. Syst. Ent.* 373. 2; *Ent. Syst.* ii. 293. 1.

Rossi, Mant. i. 139. 308.

Panz. Faun. Germ. 62. 15 ♂.

Mellinus interruptus, *Panz. Faun. Germ.* 72. 13 ♀?

Nysson spinosus, *Latr. Hist. Nat.* xiii. 305; *Gen. Crust. et Ins.* iv. 91.

Oliv. Encycl. Méth. viii. 804.

Van d. Lind. Obs. ii. 30. 1.

Shuck. Foss. Hym. 100. 1.

Dahlb. Hym. Europ. i. 169. 100. & 484. 1.

Wesm. Hym. Foss. Belg. 74. 1.

Sphex spinosa, *Villers*, iii. 246. 71.

Nysson geniculatus, *St. Farg. Hym.* iii. 47. 3.

Female. Length $5\frac{1}{2}$ lines.—Black; the head coarsely punctured below the antennæ, thinly covered with silvery pubescence; antennæ reaching to the base of the scutellum; tips of the mandibles ferruginous. Thorax: the collar with an uninterrupted yellow band; the mesothorax closely and strongly punctured; the scutellum longitudinally striated; the metathorax coarsely rugose; wings fusco-hyaline, with a dark cloud round their apical margins, commencing at the base of the marginal cell; the posterior femora, the apex of the intermediate and anterior pairs, all the tibiæ and tarsi, ferruginous; the anterior and intermediate tibiæ have sometimes a dusky ring in the middle. Abdomen finely granulated, the basal segment with strong longitudinal punctures which run into striæ at the extreme base; an interrupted yellow fascia on the apical margin of the basal segment, and an uninterrupted one on the two following segments, slightly attenuated in the middle.

Male.—About the same size as the female, but with a dense silvery pubescence on the clypeus; the mesothorax beneath the coxæ, and posterior femora beneath covered with silvery pile; the yellow band on the collar frequently more or less obsolete at the sides, sometimes entirely so; the tibiæ usually black, excepting their base; the yellow bands on the abdomen frequently more or less interrupted.

This is the most abundant species in the London district; it frequents woods and wood-sides, and is very partial to the flowers of the Wood-spurge; it usually appears in June. I have never seen it burrowing, but the female I have detected entering holes in banks of light earth. The species is widely distributed, and has been taken in Yorkshire in the month of July.

2. *Nysson interruptus*.

N. niger; *antennis paulo capite longioribus, abdomine fasciis tribus flavis.*

Mellinus interruptus, *Fabr. Ent. Syst. Suppl.* 266. 4-5.

Mellinus dissectus, *Panz. Faun. Germ.* 77. 18.

Oxybelus interruptus, *Fabr. Syst. Piez.* 316. 1.

Nysson maculatus, *Van d. Lind. Obs.* ii. 31. 4.

Dahlb. Hym. Europ. i. 170. 103.

Nysson omissus, *Dahlb. Hym. Europ.* i. 485. 3?

Nysson interruptus, *Shuck. Foss. Hym.* 101. 2.

Dahlb. Hym. Europ. i. 170. 103.

St. Farg. Hym. iii. 45. 1.

Wesm. Hym. Foss. Belg. 80. 5.

Female. Length $3\frac{1}{2}$ –4 lines.—Black; head very closely punctured; the clypeus with a silvery pubescence; the antennæ a little longer than the head. Thorax closely punctured and pubescent; the collar and tubercles yellow, a small space at the base of the metathorax regularly striate; the tegulæ testaceous; the wings fuscous, with their apical margins slightly clouded; legs ferruginous, with the coxæ, trochanters, and femora, except their apex, black; the mesothorax silvery beneath. Abdomen finely shagreened, the first two segments with deeper dispersed punctures; the apical margins of the three basal segments with a yellow fascia, the first interrupted, the two latter attenuated in the middle; the first fascia sometimes entire.

The *Male* only differs in having a dense silvery pubescence on the clypeus and on the mesothorax beneath.

This species is extremely local; it is occasionally taken in the London district, but I have not found it elsewhere: it occurs occasionally with the former species in Bishop's Wood, Hampstead, and also at Highgate.

3. *Nysson trimaculatus*.

N. ater; abdumine utrinque maculis tribus flavis.

Crabro trimaculatus, *Rossi, Faun. Etrus.* ii. 95. 892 ♂.

Nysson trimaculatus, *Van d. Lind. Obs.* ii. 30. 2 ♂ ♀.

Shuck. Foss. Hym. 102. 3.

Dahlb. Hym. Europ. i. 169. 101.

St. Farg. Hym. iii. 46. 2.

Nysson maculatus, *Wesm. Hym. Foss. Belg.* 78. 4 (var.?).

Female. Length $3\frac{1}{2}$ –4 lines.—Black; the head coarsely punctured and slightly pubescent; the antennæ a little longer than the head, the face with a little silvery pubescence, the tips of the mandibles ferruginous. Thorax very coarsely punctured, the punctures confluent; the collar, tubercles, and a transverse line at the base of the scutellum, yellow; the base of the metathorax with a few coarse longitudinal striæ; the sides of the metathorax, as far as the lateral spines, covered with silvery pubescence; wings hyaline, their apical margins clouded; the knees and the apex of the tibiæ and tips of the joints of the

tarsi rufescent. Abdomen rather finely and distantly punctured, the basal segment most strongly so; the first segment has on each side a large triangular yellow spot, and the second and third a transverse yellow macula, the margins obscurely rufopiceous.

Var. β . The base of the abdomen red.

Male.—This sex only differs in having the apical joint of the antennæ much narrower than the penultimate one, and inserted somewhat obliquely; the face and clypeus thickly covered with silvery pubescence; the thorax without the yellow spots; the fourth segment of the abdomen with a transverse yellow line.

Var. β . with a central yellow spot on the collar.

This is a very local and rare species. It used to be taken at Battersea; it occurs at Southgate, near Colney Hatch, in July; it has also been taken at Weybridge. I have most frequently captured this insect when beating bushes for Coleoptera; it mimics death in the same way as *Hedychrum* and *Chrysis*.

4. *Nysson guttatus*.

N. niger; thorace maculato, abdomine punctis sex transversis flavis, segmentoque primo rufo.

Nysson guttatus, *Oliv. Encycl. Méth.* viii. 409. 7.

Shuck. Foss. Hym. 103. 4.

Male. Length $4\frac{1}{2}$ lines.—Black; the head punctured and pubescent; the face with a little silvery pubescence. Thorax coarsely punctured; the collar, tubercles, and a line on the scutellum cream-coloured; the metathorax longitudinally striated at its base, and the sides of the upper surface covered with silvery pubescence; the wings slightly coloured, their apical margins clouded, the nervures and tegulæ piceous; the legs ferruginous, with the coxæ and base of the anterior femora black. Abdomen punctured, the basal segment red, with a small ovate transverse spot on each side, and a transverse line on each side of the two following at their apical margins cream-coloured.

After a careful examination of the typical specimen described by Shuckard, I can only see a large and highly coloured example of *N. dimidiatus*: the true "*guttatus*" of Olivier may be distinct; but, if so, it is probably synonymous with the *Sphex maculata* of Fabr. (*Nysson maculatus* of Van d. Lind.).

5. Nysson dimidiatus.

N. niger; abdominis segmento primo rufo, et secundo utrinque macula transversa alba signata.

Nysson dimidiatus, *Jurine, Hym. t. 10. f. 22.*

Oliv. Encycl. Méth. viii. 409. 9.

Van d. Lind. Obs. ii. 33. 6.

Shuck. Foss. Hym. 104. 5.

Dahlb. Hym. Europ. i. 171. 105.

St. Farg. Hym. iii. 49. 5.

Wesm. Hym. Foss. Belg. 82. 6.

Nysson Wesmaeli, *St. Farg. Hym. iii. 50. 6.*

Female. Length 3 lines.—Black; head punctured, the face with a silvery pubescence; the mandibles ferruginous. Thorax shining and punctured; the tubercles white; an enclosed half-circular space at the base of the metathorax, longitudinally striated; the sides of the upper surface of the metathorax covered with silvery pubescence; wings subhyaline, their apical margins slightly clouded; the anterior and intermediate tibiæ and tarsi and posterior tibiæ at their base and apex, with sometimes a stain at the side, ferruginous; the anterior tibiæ with usually a dark stain behind. Abdomen finely punctured, the margins of the segments slightly constricted; the first segment and base of the second red, with a transverse white line on each side of the second near the apical margin, and sometimes a minute spot of the same colour on the third; the margin of the second and following segments obscurely rufo-fusca.

Var. β . The second segment of the abdomen entirely red.

Var. γ . The second segment of the abdomen black.

Var. δ . The first segment of the abdomen with a yellow macula on each side.

The *Male* differs in having the face densely covered with silvery pubescence; the apical joint of the antennæ bi-emarginate beneath; the scape with usually a white stripe in front; the first segment of the abdomen has sometimes a white spot on each side, and the third segment has frequently a narrow transverse line on each side.

This species is of rare occurrence, but it is widely distributed; it is taken in the London district at Hampstead and Highgate; it has also been taken at Weybridge and at Southend in July and August, and on the sand-hills at Deal. When alarmed, it feigns death and drops to the ground.

Genus 2. GORYTES.

- Sphex, pt., *Linn. Syst. Nat.* i. 944 (1766).
 Vespa, pt., *Linn. Faun. Suec.* 1677 (1766).
 Crabro, pt., *Fabr. Syst. Ent.* 375 (1790).
 Mellinus, pt., *Fabr. Ent. Syst.* ii. 285 (1793).
 Gorytes, *Latr. Hist. Nat.* xiii. 308 (1805).
 Arpactus, pt., *Jurine, Hym.* 194 (1807).
 Hoplisus, *St. Farg. Ann. Soc. Ent. Fr.* i. 62 (1832).
 Euspongius, *St. Farg. Ann. Soc. Ent. Fr.* i. 66 (1832).
 Lestiphorus, *St. Farg. Ann. Soc. Ent. Fr.* i. 70 (1832).

Head transverse; eyes ovate and lateral; the stemmata placed in a curve forward on the vertex; antennæ subfiliform, inserted at the base of the clypeus, longer in the males than in the females, and slightly thickened towards the apex; the clypeus transverse, rounded in front; the labrum exerted, transverse, rounded anteriorly, and fringed with long setæ; the mandibles with two obtuse teeth. Thorax ovate; the collar transverse; scutellum transverse and quadrangular; the metathorax obtuse or gibbous, and truncated at its apex; the anterior wings with one marginal and three submarginal cells; the marginal cell elongate; the first submarginal nearly as long as the two following; the second much narrowed towards the marginal, receiving both the recurrent nervures; the third quadrangular and oblique; the legs moderately long, and having generally a large pulvillus between their terminal bifid claws. Abdomen ovato-conic, curved at the extremity; the second ventral segment, in some species, suddenly produced in front and at right angles with its plane.

In this genus some species have a fourth submarginal cell distinctly enclosed; but in the type, *G. mystaceus*, it is incomplete: we treat this variation as specific in this instance.

1. *Gorytes mystaceus*.

- G. niger*; scutello flavo; abdomine fasciis tribus vel quatuor flavis, prima interrupta, tibiis ferrugineis. *Fæm.*
G. niger; antennis longioribus, scutello nigro; tibiis flavis nigrisque. *Mas.*

Sphex mystaceus, *Linn. Faun. Suec.* 412. 1653; *Syst. Nat.* i. 944' 21, & *Cab. Mus. Linn. Soc.* 3.
Christ. Hym. 270.

- Vespa campestris*, Linn. *Faun. Suec.* 417. 1677; *Syst. Nat.* 950.
 13, & *Cab. Mus. Linn. Soc.* ♀.
Fabr. Syst. Ent. 369. 31.
Rossi, Faun. Etrus. ii. 88. 873.
Christ. Hym. 234.
Oliv. Encycl. Méth. vi. 689. 96.
Mellinus mystaceus, *Fabr. Ent. Syst.* ii. 285. 1 ♂.
Panz. Faun. Germ. 53. 11.
Mellinus campestris, *Fabr. Ent. Syst.* ii. 287. 6.
Arpactus campestris, *Panz. Krit. Revis.* ii. 165.
Arpactus mystaceus, *Jurine, Hym.* 194.
Sphex longicornis, *Illig. Ed. Faun. Etrus.* ii. 104. 827. t. 6. f. 9.
Gorytes mystaceus, *Latr. Gen. Crust. et Ins.* iv. 89.
Van d. Lind. Obs. ii. 94. 9.
Shuck. Foss. Hym. 211. 1.
Dahlb. Hym. Europ. i. 166. 98.
St. Farg. Anp. Soc. Ent. Fr. i. 57. 1; *Hym.* iii. 55. 1. t. 28. f. 8.
Wesm. Hym. Foss. Belg. 85. 1.

Female. Length 5-6 lines.—Black, shining and punctured; antennæ nearly as long as the head and thorax; an oblique yellow line on each side at the base of the clypeus, frequently united; tips of the mandibles ferruginous. Thorax closely punctured; the metathorax with a triangular space at its base longitudinally striated, beyond which it is coarsely rugose, with a deep central incisure, the apex truncated; the collar, tubercles, and post-scutellum yellow; wings slightly coloured, a fuscous cloud occupies the marginal cell and passes round the apex of the anterior wings, the nervures and stigma pale rufo-testaceous; the tibiæ and tarsi ferruginous and entirely simple. Abdomen shining and delicately punctured, the first segment more strongly so; an ovate transverse yellow spot on each side of the basal segment, near its margin; a band of the same colour occupying the margin of the second and third segments, waved in front, the first dilated at the sides; the fourth segment has sometimes a transverse line in the middle of the margin; the second ventral segment abruptly produced at its base, and with strong scattered punctures.

The *Male* frequently smaller than the female, and having a silvery pubescence on the face below the antennæ; the antennæ longer than the head and thorax, the joints subarcuate; the yellow markings on the thorax frequently more or less obsolete, that on the post-scutellum usually so, but the collar has generally more or less yellow; the anterior and intermediate tibiæ yellow, with a black streak behind, the first joint of their tarsi yellow; the posterior tibiæ with a yellow line in front, not extending to their apex; their tarsi, and the remaining joints of the others,

piceous, increasing in colour from their base; the band on the margin of the second segment rarely interrupted in the middle.

This is a very abundant insect during the months of May and June; it frequents hedge-rows, preferring those at wood-sides, where it settles on leaves and flowers, particularly on the Wood-spurge. Shuckard captured it with the larva of *Aphrophora*. I have more than once seen it conveying a small Lepidopterous larva. It is found in all parts of the kingdom.

2. *Gorytes Fargeii*.

G. niger; prothorace, linea subscutello, segmentis quatuor abdominis fascia, tibiis tarsisque flavis.

Mellinus quadrifasciatus, *Panz. Faun. Germ.* 98. 17 ♂.

Arpactus quadrifasciatus, *Panz. Krit. Revis.* ii. 165.

Gorytes campestris, *St. Farg. Ann. Soc. Ent. Fr.* i. 58. 2 (nec Linn.).

Dahlb. Hym. Europ. i. 168. 99.

St. Farg. Hym. iii. 58. 2.

Wesm. Hym. Foss. Belg. 85. 2.

Gorytes Fargeii, *Shuck. Foss. Hym.* 214. 2.

Female. Length 4-5 lines.—Black; the head and thorax shining and closely punctured; the clypeus with a broad yellow band at its base; the labrum fringed with fulvous setæ; tips of the mandibles dark ferruginous. Thorax: the mesothorax with a scratch on each side parallel with the epaulet of the tegulæ; the incisure at the base of the scutellum consute; the subdefined triangular space at the base of the metathorax longitudinally striated and rugose beyond, with a deep central longitudinal impression, the apex truncated; the collar, tubercles, a lunule beneath the wings, and the post-scutellum, yellow; the wings slightly coloured and iridescent, a slight cloud occupying the marginal cell, and passing along the apical edge of the wings; the stigma and nervures pale rufo-testaceous; the tibiæ and tarsi yellow, the former with a dark stain beneath; the legs simple. Abdomen: the margins of the first, second, third and fourth segments with a yellow band waved in front, and much broader at the sides, the fifth segment with sometimes a small transverse abbreviated line in the middle; the second ventral segment abruptly produced at its base and very finely punctured.

Male. Length 4-5 lines.—Differs in having the clypeus yellow and covered with silvery pubescence; the antennæ a little

longer than the head and thorax : in other respects it resembles the female.

This species is not rare in the neighbourhood of Highgate ; it has also been taken about Wandsworth and Battersea, but it is certainly very local, and has not been frequently taken out of the London district ; it appears about the end of June. Shuckard observed it conveying the larva of *Aphrophora spumaria*. I took a few specimens near Lowestoft, Suffolk.

3. *Gorytes quadrifasciatus*.

G. niger ; *antennis subtus flavis* ; *prothorace, scutelli margine posteriori et abdomine fasciis quatuor flavis* ; *tibiis tarsisque ferrugineis*. *Fœm.*

G. scutello toto nigro. Mas.

Mellinus quadrifasciatus, Fabr. Syst. Piez. 298. 5 ♂.

Gorytes quadrifasciatus, Latr. Gen. Crust. et Ins. iv. 90.

Van d. Lind. Obs. ii. 96. 10 ♂.

Shuck. Foss. Hym. 215. 3.

Hoplisus quadricinctus, Dahlb. Hym. Europ. i. 159. 91.

Wesm. Hym. Foss. Belg. 86. 1.

Gorytes libitinaris, Curtis, Brit. Ent. xi. 524.

Euspongos vicinus, St. Farg. Hym. iii. 69. 2.

Female. Length $4\frac{1}{2}$ –5 lines.—Black ; head shining and finely punctured ; the scape yellow in front, the basal joints of the flagellum fulvous beneath, the pedicel black ; the clypeus with a central yellow spot, and another at the lateral angles, or sometimes forming a transverse stripe ; a small spot or line on the inner margin of the eyes, opposite the insertion of the antennæ, and two united spots between the antennæ, yellow ; the anterior margin of the labrum and the palpi yellow, the latter black at their base. Thorax delicately punctured ; the suture at the base of the scutellum consute ; the metathorax with the triangular space at its base longitudinally coarsely striated, beyond which it is coarsely rugose, with the apex obtuse ; the collar, a lunate spot behind the tubercles, and a transverse stripe on the posterior margin of the scutellum, yellow, the latter sometimes obsolete ; wings hyaline, with a dark cloud occupying the marginal, apex of the first submarginal, and the whole of the second submarginal cells ; the stigma and nervures pale rufo-testaceous ; the knees, tibiæ and tarsi ferruginous ; the anterior femora with a yellow line in front, the anterior tarsi strongly ciliated, and the intermediate and posterior tibiæ spinose. Abdomen delicately punctured and shining, with a yellow band on the apical

margin of the first four or five segments, the first and second broadest and much dilated at the sides; the second, third and fourth usually continued beneath, the fifth frequently obsolete; the base of the second ventral segment only slightly convex.

The *Male* differs in having the flagellum black beneath, with a minute yellow spot on the pedicel; the tibiae are yellow in front, and the anterior and intermediate tarsi of a testaceous yellow, the tips of the apical joint piceous; the posterior pair with the basal joint ferruginous, the rest piceous.

An abundant insect, widely distributed; like the first species, it is usually found most abundant on Umbelliferae at the borders of woods.

4. *Gorytes laticinctus*.

G. niger; antennis subtus flavis; prothorace, scutelli margine posteriori, abdomineque fasciis quatuor, flavis. *Fœm*.

G. antennis et scutello nigris. Mas.

Gorytes quadrifasciatus, Spin. Ins. Ligur. i. 93. 2.

Gorytes arenarius, Van d. Lind. Obs. ii. 97. & 2nd ♂.

Eusponus laticinctus, St. Farg. Ann. Soc. Ent. Fr. i. 66. 1; Hym. iii. 66. 1. t. 25. f. 6.

Gorytes laticinctus, Shuck. Foss. Hym. 217. 4.

Hoplisis laticinctus, Dahlb. Hym. Europ. i. 161. 92.

Weem. Hym. Foss. Belg. 86. 2.

Female. Length $5\frac{1}{2}$ lines.—Black; head shining and delicately punctured; the scape yellow in front; the flagellum beneath, excepting the last two joints, fulvous yellow, with a black line above; the lower portion of the inner orbits of the eyes, the clypeus, labrum, and palpi, yellow; apex of the mandibles piceous. Thorax shining and delicately punctured, with four parallel longitudinal impressed lines extending from the base of the mesothorax to its disk; the metathorax with a subdefined angular space at the base, which is longitudinally rugose-striate, beyond coarsely rugose and obtusely truncated; the epaulet over the tegulae, and the incisure at the base of the scutellum consute; the collar, a spot beneath the wings, the tegulae in front, and a transverse line on the scutellum, yellow; the wings slightly coloured, the stigma and nervures rufo-testaceous; a dark cloud occupies the marginal, and upper portion of the second and third submarginal cells; the legs yellow, the anterior and intermediate femora with a black stripe above, the posterior coxae and femora black, the latter with their apex

yellow; a piceous stain at the apex of the tibiæ behind; the posterior tarsi dusky, with the claw-joint darkest; the anterior tarsi ciliated, the tibiæ slightly spinose. Abdomen shining, and with a broad yellow band on the first four segments, sometimes a narrower one on the fifth segment, and two longitudinal spots on the apical one—the latter is of rare occurrence; the first band slightly emarginate in front.

Male.—Rather smaller, and differing in having the antennæ black, or with sometimes a minute yellow spot on the scape in front; the clypeus with a silvery pubescence, and the scutellum black; the legs with the anterior and intermediate femora at their apex in front, the knees and tibiæ in front, as well as the tarsi, yellow, with their claw-joint piceous; the knees of the posterior legs ferruginous, their tibiæ yellow beneath, and their tarsi black; the abdomen with five yellow bands, and the sixth and seventh segments covered with fuscous pubescence.

This is a rare species; no locality except that mentioned by Shuckard is known, namely the New Forest, Hants. Continental specimens are frequently more highly coloured than British ones, having usually six bands on the abdomen, and the legs yellower.

5. *Gorytes bicinctus*.

G. ater; antennis subtus ferrugineis, articulo primo flavo; prothorace, abdomine fasciis duabus, primo segmento (coarctato) puncto utrinque, flavis.

Crabro bicinctus, Rossi, *Faun. Etrus. Append.* 123. 110.

Lestiphorus bicinctus, St. Farg. *Ann. Soc. Ent. Fr.* i. 70. 1; *Hym.* iii. 73. 1.

Dahlb. Hym. Europ. i. 156. 90.

Wesm. Hym. Foss. Belg. 94. 1.

Gorytes bicinctus, Van d. Lind. *Obs.* ii. 937.

Curtis, Brit. Ent. v. t. 524 ♂.

Shuck. Foss. Hym. 219. 5.

Female. Length $4\frac{1}{2}$ lines.—Black; head opaque, and very delicately punctured; the scape yellow beneath; the flagellum fuscous beneath, excepting two or three of the apical joints; the lower portion of the face, the clypeus, and labrum, yellow; the mandibles fuscous in the middle. Thorax delicately punctured; the mesothorax having two slightly impressed longitudinal lines at its base, extending to the disk; the triangular space at the base of the metathorax longitudinally striated, with a carina in the centre; the collar, tubercles, and two spots on

the scutellum, yellow; wings hyaline, with a dark cloud occupying the marginal, second submarginal, and a portion of the third discoidal cell; the stigma fulvous, the nervures pale rufo-testaceous; the apex of the anterior coxæ and trochanters, and the femora and tibiæ beneath, yellow; the extreme base of the posterior tibiæ fulvous beneath; the anterior and intermediate tarsi fulvous, with the claw-joint piceous, the posterior tarsi entirely so; the anterior tarsi strongly ciliated, the legs spinose. Abdomen shining and delicately punctured; the first segment subpyriform, with a large triangular yellow spot on each side uniting in the middle or only slightly interrupted; the second segment with a broad yellow band just before the margin; the margin of the third with a narrow band, which is continued across the venter.

The *Male* differs in having the inner orbits of the eyes yellow; the antennæ with the tenth joint notched beneath; the mandibles yellow, with their apex piceous; the tarsi yellow testaceous; the posterior tibiæ yellow on the outside at their base; and the terminal segment of the abdomen with two strong setæ.

Only two or three specimens of this species have been captured in this country; it is said to have occurred near London. Mr. Curtis's specimen was captured in the New Forest, Hants.

Genus 3. HARPACTUS.

- Pompilus, pt., *Panz. Faun. Germ.* 81. 15.
- Mellinus, *Panz. Krit. Revis.* ii. 169.
- Arpactus, pt., *Jurine, Hym.* 194.
- Gorytes, pt., *Wesm. Not. Gar.* ii. 7.
- Harpactus, *Shuck. Foss. Hym.* 221.
- Larra, pt., *Dahlb. Exerc. Hym.* 51.

Head subrotund, as wide as the thorax; eyes ovate, lateral; the stemmata placed in a curve forward on the vertex; antennæ of the same length in both sexes, curved in the female, porrect in the male, with the tenth joint notched beneath, and the apical one a little bent, inserted at the base of the clypeus; the clypeus transverse, convex, slightly marginate in front; labrum triangular; mandibles bidentate. Thorax ovate; collar slightly narrowed in front into a neck; the scutellum transverse; the metathorax truncated; the anterior wings with one marginal and three submarginal cells, the marginal cell long and narrow, the second submarginal receiving both the recurrent nervures;

the anterior tarsi ciliated, the intermediate and posterior tibiæ spinose. Abdomen ovate-conical, acuminate and bent downwards at the apex.

1. *Harpactus tumidus*.

H. niger; abdomine rufo, apice nigro, lunulis duabus pone medium maculaque anali albis.

Pompilus tumidus, *Panz. Faun. Germ.* 81. 15 ♂.

Mellinus tumidus, *Panz. Krit. Revis.* ii. 169.

Gorytes tumidus, *Latr. Gen. Crust. et Ins.* iv. 89.

Van d. Lind. Obs. ii. 92. 4.

Wesm. Not. Gor. ii. 7.

Arpactus tumidus, *Jurine, Hym.* 194.

St. Farg. Ann. Soc. Ent. Fr. i. 77. 3; *Hym.* iii. 82. 3.

Shuck. Foss. Hym. 222. 2.

Dahlb. Hym. Europ. i. 149. 82.

Wesm. Hym. Foss. Belg. 95. 2.

Larra tumida, *Dahlb. Exerc. Hym.* 51. 3.

Female. Length $3\frac{1}{2}$ lines.—Head and thorax black, the former delicately punctured; the face and clypeus covered with silvery pubescence; a longitudinal impression extending from the base of the antennæ to the anterior stemma; a sanguineous line at the posterior margin of the eyes; the scape white in front; the inner orbit of the eyes with a white line joining another which crosses the anterior margin of the clypeus, the latter sometimes testaceous in the middle; the labrum white, fringed with a few silvery setæ; the mandibles testaceous yellow, their apex piceous. Thorax delicately punctured, interspersed with larger punctures; the mesothorax with two or three longitudinal lines, which terminate at the disk; the incisure at the base of the scutellum consute; the triangle at the base of the metathorax with two longitudinal parallel carinæ in the centre, the interstices obliquely striated, sometimes obsolete, the whole enclosed by an elevated ridge, which is encircled by abbreviated radiating striæ, beyond which it is smooth, and covered at the sides with silvery pubescence; the posterior edge of the tubercles and the centre of the scutellum with a white spot; the wings slightly coloured, the nervures piceous, the tegulæ testaceous; the anterior and intermediate femora beneath and in front, and the tibiæ in front, yellow testaceous; the posterior tibiæ ferruginous at their base; all the tarsi piceous, the anterior pair strongly ciliated, the intermediate and posterior tibiæ spinose. Abdomen delicately punctured, the two basal segments red, the following black and

shining, an ovate white spot on the lateral margins of the second segment, and another in the centre of the base of the fifth.

The *Male* is usually rather smaller, and differs in having more silvery pubescence on the face; the antennæ, except the basal joint, piceous beneath; the white spot on the fifth segment forming a band a little dilated in the middle, and the sixth with a longitudinal white line in the centre; the white markings on the clypeus are sometimes wanting, as well as the spot on the scutellum, and sometimes the spots on the sides of the second segment, and the band on the fifth also; in some examples both the band and line on the sixth are wanting.

The prey of this insect has not been ascertained; it is occasionally found in hot sandy situations, where the female has been observed burrowing. I have taken it on Hampstead Heath in July and August; at Erith, and also at Deal, in September; and at Lowestoft in July and August*.

Genus 4. DIDINEIS.

Pompilus, pt., *Fabr. Ent. Syst. Supp.* 249.

Alyson, *Latr. Gen. Crust. et Ins.* iv. 86.

* *Didineis*, *Wesm. Hym. Foss. Belg.* 96.

Head subrotund; antennæ filiform, inserted at the base of the clypeus, the scape slightly bent; the clypeus transverse, convex, the anterior edge with a slight margin, which is tridentate in the female and edentate in the male; the mandibles tridentate, the teeth obtuse, the labrum concealed. Thorax sublinear; the collar transverse, quadrate, considerably narrower than the thorax; the metathorax elongate, truncated posteriorly, with a spine on each side near the vertex of the truncation; the anterior wings with one marginal and three submarginal cells; the marginal cell oblong ovate; the first submarginal cell longer than the two following, receiving the first recurrent nervure at its apex; the second submarginal subtriangular and petiolated, receiving the second recurrent nervure at its apex; the legs slender, moderately long, the anterior tarsi having the

* The *Harpactus lavis* is, I believe, an Italian species, erroneously included in the British list.

first joint long, the three following short, the apical one longer, armed at the apex with a bifid claw; the intermediate and posterior tibiæ armed with two spines at their apex; the posterior femora with a small dentiform process beneath at their apex. The abdomen ovate, acuminate at the apex in the female, truncated in the male, with a small spine at the angles of the truncation.

I have followed M. Wesmæl in separating the species from the genus *Alyson*, in which the neururation of the wings is different, and the intermediate tibiæ only armed with one calcar or spur at their apex.

1. *Didineis lunicornis*.

D. niger; abdominis segmentis duobus primis rufis, tibiis tarsisque quatuor posticis fusco-rufis, alarum superiorum fascia transversali fusca. *Fæm.*

D. antennarum articulo ultimo lunato. Mas.

Pompilus lunicornis, *Fabr. Ent. Syst. Suppl.* 249. 21; *Syst. Piez.* 194. 32.

Alyson lunicornis, *Latr. Gen. Crust. et Ins.* iv. 86.

Van d. Lind. Obs. ii. 88. 1.

Shuck. Foss. Hym. 207. 1.

Dahlb. Hym. Europ. i. 142. 75 & 474.

St. Farg. Hym. iii. 86. 1.

Alyson Kennedii, *Curtis, Brit. Ent.* xiii. t. 584 ♀.

Didineis lunicornis, *Wesm. Hym. Foss. Belg.* 97. 1.

Female. Length $3\frac{1}{2}$ lines.—Black and shining; the head delicately punctured; the scape rufescent in front, the flagellum fulvous beneath; the clypeus rufescent in front; the mandibles yellow, with their apex piceous. Thorax delicately punctured; the metathorax with an elongated triangular space at its base, which is enclosed by an elevated ridge, within which it is rugose; the sides obliquely striated; the wings slightly coloured, with a transverse fascia crossing at the marginal cell and extending halfway across the third discoidal cell; the nervures and tegulæ rufo-testaceous; the legs simple, with the knees of the anterior femora, and the inside of the tibiæ, as well as the tarsi, of a testaceous yellow; the intermediate and posterior tibiæ and tarsi rufo-piceous, the posterior tibiæ rufescent towards their base, their tarsi piceous, and the articulations of the coxæ and trochanters fulvous. Abdomen: the two basal segments, and sometimes the base of the third, red, with a triangular sericeous spot on each side towards their margin, most conspicuous on the second segment, but frequently obliterated.

The *Male* is about the same size as the female, but differs in having the terminal joint of the antennæ lunulate, the clypeus with a slight silvery pubescence, and the first and basal half of the second segment red.

This species was first discovered in this country by Mr. Curtis, at Hastings, since which it has been captured near Ryde in the Isle of Wight, and near Bristol; no other localities are known.

Genus 5. MELLINUS.

Vespa, pt., *Linn. Syst. Nat.* i. 948 (1766).

Crabro, pt., *Fabr. Mant.* i. 294 (1787).

Mellinus, pt., *Fabr. Ent. Syst.* ii. 285 (1793).

Head as wide as the thorax; eyes large, lateral, and ovate; the stemmata placed in a curve forward on the vertex; antennæ inserted at the base of the clypeus, distant, filiform, with the scape subobconic; the clypeus transverse, the anterior margin rounded, with three short teeth in the centre; labrum linear, concealed; the mandibles tridentate in the female, bidentate in the male, the apical tooth acute. Thorax ovate, the collar transverse; the scutellum subquadrate; the metathorax obtuse, with an enclosed space at its base; the anterior wings with one marginal and four submarginal cells; the marginal cell elongate, narrow, and pointed at its apex; the first submarginal cell as long as the two following, receiving the first recurrent nervure very near its apex; the second submarginal much narrowed towards the marginal; the third wider, oblique, and slightly narrowed towards the marginal, and receiving the second recurrent very near its base; the fourth submarginal extending to the apex of the wing; the legs slender and slightly spinose. Abdomen lanceolate, the basal segment forming a long petiole, which is narrow at its base and nodose at its extremity.

Having frequently observed the habits of the type of this genus, *M. arvensis*, and reared it from the larva state, a few observations are here recorded. When the parent insect has formed a burrow of the required length, and enlarged the extremity into a chamber of proper dimensions, she issues forth in search of the proper nutriment for her young; this consists of various Dipterous insects: species of various genera are equally adapted to her purpose—*Muscidæ*, *Syrphidæ*, &c., are captured.

It is amusing to see four or five females lie in wait upon a patch of cow-dung until some luckless fly settles on it; when this happens, a cunning and gradual approach is made—a sudden attempt would not succeed: the fly is the insect of quickest flight; therefore a degree of artifice is necessary; this is managed by running past the victim slowly, and apparently in an unconcerned manner, until the poor fly is caught unawares and carried off by the *Mellinus* to its burrow; the first fly being deposited, an egg is laid, the necessary number of flies are soon secured, and her task is completed; but sometimes she is interrupted by rainy weather, and it is some days ere she can store up the quantity required. A larva found feeding became full-fed in ten days; six flies were devoured, the heads, harder parts of the thorax, portions of the abdomen, and the legs being left untouched. The larva spins a tough, thin, brown silken cocoon, passes the winter and spring in the larva state, changes to the nymph on the approach of summer, and appears about the beginning of autumn in the perfect state.

1. *Mellinus arvensis*.

M. niger; abdomine fasciis quatuor (tertia interrupta) pedibusque flavis.

Vespa arvensis, Linn. *Faun. Suec.* 418. 1678; *Syst. Nat.* i. 950. 12.

Fabr. Syst. Ent. 368. 30; *Mant.* i. 291. 49.

Villers, Ent. iii. 269. 9.

Christ. Hym. 234.

Vespa superbus, Harris, *Expos.* 227. 3. t. 37. f. 3 ♀.

Crabro bipunctatus, *Fabr. Mant.* i. 296. 18.

Oliv. Encycl. Méth. vi. 516. 20.

Crabro U-flavum, *Panz. Faun. Germ.* 17. 20.

Mellinus bipunctatus, *Fabr. Ent. Syst.* ii. 286. 4.

Mellinus arvensis, *Fabr. Ent. Syst.* ii. 287. 7; *Syst. Piez.* 299. 10.

Latr. Hist. Nat. xiii. 319. 3; *Nouv. Dict.* 2nd ed. 20. 100.

Duméril, Dict. des Sc. Nat. 30. 2. 2.

Van d. Lind. Obs. ii. 84. 1.

Zett. Ins. Lapp. 440. 1.

Shuck. Foss. Hym. 203. 1.

St. Farg. Hym. iii. 91. 1.

Dahlb. Hym. Europ. i. 226. 131.

Wesm. Hym. Foss. Belg. 96. 1.

Sphex arvensis, Ratz. *Forst. Ins.* Bd. iii. 35.

Female. Length 6-7 lines.—Black; the head closely and finely punctured, the cheeks with a thin short silvery-white pubescence; a narrow line at the inner orbit of the eyes, sometimes an interrupted one at the base of the clypeus, the scape in front

and the palpi yellow; the flagellum fulvous beneath; sometimes a yellow spot at the base of the mandibles. Thorax closely and finely punctured; the metathorax with a rugose ovate space at its base, which is enclosed by a horseshoe-shaped frame, which is delicately punctured and shining, beyond which it is rugose; the collar, tubercles, tegulæ in front, and the scutellum, yellow; the wings hyaline, the nervuræ, and tegulæ behind, testaceous; the legs yellow, the coxæ, and femora at their base, more or less black; the anterior tibiæ with a dark spot behind, the intermediate and posterior tibiæ ferruginous within; the anterior tarsi ciliated, the intermediate and posterior tibiæ spinose. Abdomen shining, finely punctured; the first segment with a yellow spot on each side at its apex, and sometimes a third in the centre, but all frequently obliterated; a broad yellow band occupying the second and three following segments, except their margin, seldom interrupted in the second, but usually with two minute black dots in the centre of its base, the fourth generally broadly interrupted, more frequently reduced to a small ovate transverse spot, with its margin testaceous.

Male. Length $3\frac{1}{2}$ –6 lines.—The clypeus and a line at the inner orbits of the eyes, the mandibles, scape in front, as well as the palpi, yellow; the thorax with yellow spots on the coxæ, and another on each side of the pectus, the legs more stained with ferruginous; the yellow band on the second segment of the abdomen usually interrupted, or entirely obliterated, that on the third segment sometimes interrupted or subinterrupted; an ovate spot on each side of the fourth segment, frequently very small, rarely wanting; a narrow central transverse abbreviated line on the fifth, and an abbreviated transverse irregular spot in the centre of the base of the sixth segment, the margins of the fifth and sixth, and the apex of the apical segment rufo-piceous.

Var. β. The fifth segment sometimes entirely black, and the sixth yellow, with a black spot on each side.

One of the most abundant fossorial insects in the country, found in most sandy situations. ●The yellow spots and bands which adorn it are very variable in size and shape.

2. *Mellinus sabulosus.*

M. niger; abdomine fasciis tribus flavis, primis duabus interruptis, pedibus ferrugineis.

Crabro sabulosus, Fabr. Mant. i. 296. 17.

Oliv. Encycl. Méth. vi. 515. 19 ♂.

- Vespa sabulosa*, *Gmelin, Ed. Syst. Nat.* i. 2763. 118.
Crabro petiolatus, *Panz. Faun. Germ.* 46. 11 ♂.
Crabro frontalis, *Panz. Faun. Germ.* 46. 12 ♀.
Mellinus sabulosus, *Fabr. Ent. Syst.* ii. 286. 2; *Syst. Piez.* 299. 2.
Van d. Lind. Obs. ii. 87. 3.
Shuck. Foss. Hym. 505. 2.
Curtis, Brit. Ent. xiii. t. 580 ♀.
Dahlb. Hym. Europ. i. 230. 133.
Wesm. Hym. Foss. Belg. 96. 2.
Mellinus ruficornis, *Fabr. Ent. Syst.* ii. 286. 3; *Syst. Piez.* 298. 3.
Panz. Faun. Germ. 77. 17.
Latr. Hist. Nat. xiii. 519. 4.
Duméril, Consid. pl. 31. f. 4 ♀.
Mellinus fulvicornis, *Fabr. Syst. Piez.* 300. 13 ♂.
Panz. Faun. Germ. 98. 18 ♂; *Krit. Revis.* ii. 169.
Van d. Lind. Obs. ii. 86. 2.

Female. Length 5-6 lines.—Black; finely punctured, with a line on the inner orbits of the eyes, the scape in front, and a minute spot on each side of the clypeus, yellow; the antennæ and mandibles ferruginous. Thorax shining and closely punctured; the metathorax with a depressed ovate space at its base which is finely rugose, this is enclosed in a horseshoe-shaped smooth space, which is punctured at the base, beyond it is rugose; a subinterrupted line on the collar, the tubercles, and a spot on the scutellum, pale yellow; the wings fulvo-hyaline, the tegulæ, nervures and stigma rufo-testaceous; the legs ferruginous, the coxæ and trochanters black. Abdomen smooth and shining, finely punctured towards the apex; a transverse ovate pale yellow spot on each side of the second and third segments, with a broad band on the fifth segment.

The *Male* is usually rather smaller than the female, and differs in having the scape and three or four of the basal joints of the antennæ more or less fuscous above; the scape is yellow beneath; the base of the femora more or less black at their base; the anterior tibiæ in front, the femora, as well as the intermediate pair, yellowish beneath, the knees sometimes yellow; the abdomen with a transverse interrupted band at the base of the third segment, and another entire at the base of the sixth, of a yellowish white.

Var. *β*. An interrupted band on the second segment.

Var. *γ*. The antennæ sometimes entirely fuscous above.

This is a local, but widely distributed species. It has been taken in Norfolk; Mr. Curtis found it in Suffolk, and Mr. Dossator captured it at Christchurch Sands, Hants; Dr. Howitt

took it at Nottingham, and Mr. Hewitson at Newcastle-on-Tyne. In 1856 it was again captured at its old locality, Nottingham, by Mr. F. C. Allen of that place. During the past season its "metropolis" may be said to have been discovered: at Pakefield, near Lowestoft, in the beginning of August 1858, I found the species in the greatest abundance: here it takes the place, as it were, of *M. arvensis*, which is plentiful in most situations, particularly on the coast. *M. sabulosus* is fond of settling on the Wild Carrot heads, and the males were seen in great numbers running on the leaves of the Coltsfoot; the female preys on various species of Diptera.

Fam. 7. Crabronidæ, *Leach*.

The head frequently very large. The abdomen oval or elliptical, sometimes clavate, sometimes petiolated; the eyes ovate, sometimes reniform.

Genus 1. TRYPOXYLON.

Sphex, pt., *Linn. Syst. Nat.* i. 941 (1766).

Trypoxylon, *Latr. Préc. Car. Ins.* (1796).

Apius, *Jurine, Hym.* 140 (1807).

Head transverse, as wide as the thorax; eyes large, their inner orbit deeply emarginate; stemmata placed in a triangle on the vertex; antennæ filiform in the female, clavate in the male, inserted at the base of the clypeus; the clypeus transverse, convex and rounded in front; the mandibles unidentate and acuminate; the abrum concealed. The thorax ovate; the collar transverse; the scutellum large, its posterior margin rounded; the metathorax oblong, much narrower than the mesothorax, the apex obtuse; the anterior wings with one marginal and one submarginal cell; the marginal cell gradually narrowed beyond the first transversocubital nervure, terminating in a point; the submarginal cell receives the recurrent nervure near its apex; a second and third submarginal are faintly traced, the latter extending to the apex of the wing; a third discoidal cell is also traced, the second recurrent nervure entering the second submarginal near its base. The legs short and simple. Abdomen elongate-clavate, the margins much constricted above, that of the first forming a subpyriform node.

1. *Trypoxylon figulus*.

T. atrum, labio segmentorumque marginibus lucidis.

Sphex figulus, Linn. *Faun. Suec.* 411. 1650; *Syst. Nat.* i. 942. 1,
& *Cab. Mus. Linn. Soc.*

Fabr. Ent. Syst. ii. 203. 19.

Villers, Ent. iii. 221. 4.

Schrank, Faun. Boic. ii. 322. 2160.

Christ. Hym. 291.

Rossi, Faun. Etrus. ii. 61. 810.

Panz. Faun. Germ. 80. 16.

Sphex leucostoma, *Schrank, Ins. Austr.* 771.

Trypoxylon figulus, *Latr. Hist. Nat.* xiii. 330.

Fabr. Syst. Piez. 181. 2.

Spin. Ins. Lig. i. 65. 1.

Van d. Lind. Obs. ii. 40. 1.

Shuck. Foss. Hym. 115. 1.

Zett. Ins. Lapp. 445. 1.

Dahlb. Hym. Europ. 280. 176.

Guér. Icon. Rêg. Anim. t. 71. f. 3.

St. Farg. Hym. iii. 228. 2.

Wesm. Hym. Foss. Belg. 106. 1.

Apius figulus, *Jurine, Hym.* 140. t. 9. gen. 8.

Female. Length 5–6½ lines.—Black; the head opaque, with the vertex slightly shining, very closely and finely punctured; an impressed longitudinal line running from the anterior stemma to the base of the antennæ; the face and cheeks with a silvery pubescence. Thorax subopaque, finely punctured and pubescent; the scutellum with a slight central depression; the metathorax with a central longitudinal impression, which terminates before the oblique truncation of its apex; beyond the verge it is again deeply impressed, the superior surface obliquely striated on each side, as well as the truncated portion; the wings slightly coloured, the nervures black, the apical margins with a dark fuscous border; the legs simple, the calcaria pale testaceous, with a small pulvillus between the bifid claws at their apex. Abdomen shining, with the posterior margins of the segments, chiefly at the sides, with a fine silvery sericeous pubescence.

The *Male* is rather smaller, but scarcely differs from the female; the face is more silvery, and the terminal joint of the antennæ is curved and acuminate.

This insect is extremely abundant everywhere; I have frequently observed it conveying its prey—spiders. In June 1845, I met with quite a colony of this insect burrowing in a bank of light earth, above which was a cut hawthorn hedge; the females were

flying in numbers from the burrows up into the hedge, where the spiders were numerous; backwards and forwards they flew, provisioning their nests with great facility. The cocoons of *Trypoxylon* may be commonly met with in banks and decayed wood; the cells are separated from each other by a partition of agglutinated sand. I have never observed this insect preying upon Aphides, as recorded in Shuckard's Essay, but always upon spiders; I have repeatedly observed the female to alight upon spiders' webs, and seizing the spider, carry it off to its cells.

The *T. aurifrons* of the Essay proves to be a Brazilian species; Mr. H. W. Bates has frequently captured it at Ega, on the Amazon, Brazil.

2. *Trypoxylon clavicentrum*.

T. nigrum; *antennis clavatis*; *tarsis pedumque anticorum parte antica pallide testaceis*.

Trypoxylon clavicentrum, *St. Farg. Encycl. Méth.* x. 750. 1; *Hym.* iii. 118. 3.

Shuck. Foss. Hym. 118. 3.

Curtis, Brit. Hym. xiv. ♀.

Dahlb. Hym. Europ. i. 279. 175.

Wesm. Hym. Foss. Belg. 107. 2.

Female. Length $3\frac{1}{2}$ lines.—Black; minutely and delicately punctured, the face with an impressed line extending from the anterior ocellus to the confluent depression of the face; the emargination of the eyes much depressed, and also a channel on each side extending from the base of the antennæ to the emargination; the emargination, channel, and face below the antennæ covered with fine silvery pile; the antennæ subclavate, the apical joint obtuse; the clypeus slightly produced in the centre, which is emarginate; the mandibles and palpi testaceous, the former black at their extreme base. Thorax with a silvery reflecting pile on the sides; the base of the metathorax enclosed, the enclosure divergently striated, and with a central longitudinal impression; at the apex of the metathorax is a deep longitudinal fossulet; the tegulæ testaceous, the wings beautifully iridescent, with their apical margins clouded; the anterior tibiæ in front, the knees and all the tarsi piceous. Abdomen shining, with the margins of the first three segments much constructed, with a silvery pubescence at the base and sides.

The *Male* is rather smaller, and has the antennæ more clavate and obtuse at their apex; the knees and femora at their apex less coloured.

This species is frequently to be found forming colonies in an old post, rail, or decaying piece of timber. I have not detected it with its prey. It is plentiful in the London district as well as elsewhere.

3. *Trypoxylon attenuatum*.

T. nigrum; antennis subclavatis; abdomine clavato, segmento primo elongato, attenuato.

Trypoxylon attenuatum, *Smith, Cat. Brit. Hym. Append.* 120.

Female. Length $3\frac{1}{2}$ lines.—Black; the head opaque, closely and very finely punctured; an impressed line extending from the anterior ocellus to the apex of the prominence between the antennæ; the clypeus clothed with silvery pile, the palpi black. Thorax subopaque, the metathorax with a subenclosed space at its base, evenly and divergently striated; in the centre is an impressed line which is continued beyond it to the apex of the metathorax; the wings beautifully iridescent, slightly clouded at their apical margins. Abdomen: the margin of the first segment much constricted, the two following slightly so, the basal segment narrowed into a long petiole, as long as the two following united, a longitudinal channel extending half its length from the base.

The *Male* only differs in having the antennæ more clavate with the apical joint acuminate.

This species has been bred from rose-sticks, into the pith of which and similar plants it burrows; it has been found at Bristol plentifully, and I have taken it in profusion at Reigate Common, burrowing in the decaying wood of an outhouse.

Genus 2. CRABRO.

Sphex, pt., *Linn. Faun. Suec.* 411 (1761).

Vespa, pt., *Linn. Faun. Suec.* 415 (1761).

Crabro, pt., *Fabr. Ent. Syst.* ii. 293 (1793).

Pemphredon, pt., *Fabr. Syst. Piez.* 314 (1804).

Rhopalum, *Kirby, Steph. Syst. Cat.* 366 (1829).

Solenius, *Blepharipus*, *Ceratocalus*, *Thyreopus*, *Crossocerus*, *Lin-denius*, *Corynopus*, and *Physoscelis*, *St. Farg. Ann. Soc. Ent. Fr.* iii. (1834).

Entomognathus, *Dahlb. Hym. Europ.* i. 295 (1834).

Head very large, subrotund or subquadrate, vertical in front;

eyes large, subtriangular, with the angles rounded, approximated at the base of the antennæ, distant on the vertex; stemmata generally placed in the centre of the vertex; antennæ geniculated, inserted at the base of the clypeus, the flagellum filiform in the females, in the males sometimes subfusiform, with the basal joints fornicate and fimbriated within, the apical joints serrated on the exterior, in others emarginate beneath, sometimes apparently consisting of twelve joints; clypeus transverse, longitudinally carinated in the centre, and covered with golden or silvery pubescence; mandibles bidentate. Thorax ovate, with the collar transverse; scutellum with the hinder margin rounded, the metathorax short and obtuse, with an enclosed space at its base, subquadrate or subcordiform, sometimes obsolete; *the anterior wings with one marginal and one submarginal cell, the marginal cell truncated at its apex, and slightly appendiculated*; the legs short and robust, usually very spinose; tarsi longer than the tibiæ; the anterior pair, in the males of some species, have the basal joint broadly dilated into a concavo-convex plate. Abdomen subsessile, lanceolate or clavate; in some species the basal segment prolonged into a petiole, which is subpyriform and nodose at its extremity.

In this genus the views of Shuckard are adopted. The known species of the genus *Crabro* have been divided and subdivided by different authors into about fifteen genera, most of them based upon what are here considered as constituting specific characters only. We cannot agree in the propriety of establishing a new genus for the reception of a single species, only distinguished from the rest by having a deep notch at the base of the mandibles, as in *Crabro brevis*: nor do we deem it advisable to separate generically those species which have the ocelli placed in a curve, from those in which they are placed in a triangle; we find numerous instances in which they are placed in an intermediate position. Many sections formed upon such specific distinctions are extremely convenient when examining an entire family; but when observation is restricted to the fauna of a district, and that a small one, these sections are too apt to be regarded as possessing a degree of importance, to which in reality they have not any legitimate claim: it is only through a knowledge of entire groups that we can hope to arrive at a correct generic distribution. The most satisfactory character hitherto employed in forming the generic divisions of this tribe

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of insects is undoubtedly the neuration of the anterior wings, and it may possibly be still further improved by carrying out Wesmael's divisions, formed upon the differences of the neuration of both the anterior and posterior wings.

Synopsis of the Species.

A.—DIV. 1. Abdomen *petiolated*. Ocelli in an *equilateral triangle*. Antennæ and tarsi *simple*.

1. *Crabro clavipes*. 2. *C. tibialis*.

B.—DIV. 2. Abdomen *subpetiolated*. Ocelli in an *equilateral triangle*. Antennæ and tarsi *simple*. Base of the *metathorax smooth and shining*.

3. *Crabro dimidiatus*. 4. *C. signatus*.

C.—DIV. 3. Abdomen *subsessile*. Ocelli in an *equilateral triangle*.

* Antennæ and tarsi *simple*. Base of the *metathorax striated*.

5. *Crabro luteipalpis*. 6. *C. proximus*. 7. *C. varius*. 8. *C. transversalis*. 9. *C. vestitus*.

** Antennæ and tarsi *simple*. Base of the *metathorax smooth and shining*.

10. *Crabro leucostoma*. 11. *C. anxius*. 12. *C. podagricus*. 13. *C. Walkeri*. 14. *C. Wesmaeli*. 15. *C. capitosus*. 16. *C. bimaculatus*. 17. *C. pubescens*. 18. *C. obliquus*. 19. *C. palidipalpis*. 20. *C. vagabundus*. 21. *C. quadrimaculatus*.

*** Antennæ *simple*. Anterior *tibiæ of the males dilated*.

22. *Crabro scutatus*. 23. *C. cetratus*.

**** Antennæ of the male with joints *emarginate beneath*; their *tarsi simple*.

24. *Crabro sexcinctus*. 25. *C. cephalotes*. 26. *C. interstinctus*.

DIV. 4. Abdomen *subsessile*. Ocelli in an *isosceles triangle*.

* Antennæ of the males *subfusiform*. Anterior *tibiæ of the males scutellate*.

27. *Crabro cribrarius*. 28. *C. patellatus*.

** Antennæ of the males *simple*. Anterior tibiæ *simple*, their tarsi *dilated*.

29. Crabro palmipes. 30. C. clypeatus.

Div. 5. Abdomen subsessile. Ocelli in a curve.

* Antennæ of the males with two or more joints emarginate beneath; their tarsi *simple*.

31. Crabro vagus. 32. C. chrysostomus.

** Antennæ of the males *simple*, their tarsi *simple*.

33. Crabro Lindenius. 34. C. albilabris. 35. C. Panzeri.
36. C. brevis.

A.—Div. 1. Abdomen petiolated. Ocelli in an equilateral triangle. Antennæ and tarsi *simple*. (Sp. 1, 2.)

1. Crabro clavipes.

C. niger; abdomine rufo-picto, primo segmento nodoso; tibi-
arum posticarum apice nigro.

Sphex clavipes, Linn. Faun. Suec. 411. 1649; Syst. Nat. i. 94. 2. 8;
& Cab. Mus. Linn. Soc. ♂.

Crabro crassipes, Fabr. Ent. Syst. Supp. 270. 26-7.

Pemphredon crassipes, Fabr. Syst. Piez. 315. 3 ♂.

Crabro rufiventris, Panz. Faun. Germ. 72. 12.

Van d. Lind. Obs. ii. 72. 34.

Shuck. Foss. Hym. 178. 35.

Physoscelis rufiventris, St. Farg. Ann. Soc. Ent. Fr. iii. 805. 1.
(1834); Hym. iii. 207. 1.

Rhopalum clavipes, Dahlb. Hym. Europ. i. 291. 178.

Weem. Hym. Foss. Belg. 126. 1.

Female. Length $2\frac{1}{2}$ –3 lines.—Black; head shining and very delicately punctured; a slightly elevated carina runs backwards from the anterior stemma between the posterior pair, passing a little beyond them; the inner orbit of the eyes and the clypeus covered with silvery pubescence; the scape and the palpi yellow; the mandibles ferruginous, sometimes yellowish in the middle; the clypeus slightly produced in front. Thorax delicately punctured, shining; the mesothorax with two central parallel impressed lines at its base, terminating towards the disk; the metathorax smooth and shining at its base, in the

centre is a slight channel; beyond the smooth space is a deep central fovea, with a line emanating from it which runs to the apex; the sides covered with white silky pubescence; the tubercles yellow-testaceous; the tegulæ testaceous; the wings hyaline and iridescent, the nervures piceous; the anterior and intermediate legs yellow, with the base of the femora and a stain inside the intermediate tibiæ piceous; the posterior legs dark rufo-piceous, with the apex of their coxæ and the base of the tibiæ yellow; the intermediate and posterior tibiæ spinose. Abdomen ferruginous, with the petiole and the base of the first segment black; the fifth segment usually piceous; sometimes the *third segment only ferruginous*, and all the margins piceous.

Male.—Rather smaller, and differing in having the sixth joint of the antennæ emarginate beneath; the joints rufo-piceous, all coloured above, and two or three of the apical ones entirely so,

This species is generally distributed. It burrows in decaying wood, from which I have several times bred it; it also perforates bramble-sticks, as do many species of this genus: by collecting perforated sticks in the spring, many of the small fossorial insects may be obtained.

2. *Crabro tibialis*.

C. niger; abdomine petiolato, primo segmento nodoso; tibiarum posticarum apice rufo.

Crabro tibialis, *Fabr. Ent. Syst. Supp.* 271. 27–8.

Panz. Faun. Germ. 83. 14.

Van d. Lind. Obs. ii. 73. 35.

Shuck. Foss. Hym. 177. 34.

Zett. Ins. Lapp. 442.

Pemphredon tibialis, *Fabr. Syst. Piez.* 315. 4.

Corynopus tibialis, *St. Farg. Ann. Soc. Ent. Fr.* iii. 803. 1 (1834);

Hym. iii. 205. 1.

Rhopalum tibiale, *Westw. Mod. Class. Ins. Gen. Synop.* 80.

Dahlb. Hym. Europ. i. 288. 177.

Curtis, Brit. Ent. xiv. t. 656 ♂.

Wesm. Hym. Foss. Belg. 127. 3.

Female. Length 2½–3 lines.—Black; head wider than the thorax, very smooth and shining, the face delicately punctured; a smooth depression at the side of each of the posterior stemmata; the scape fulvous at the base and apex beneath; the clypeus produced in the centre, projecting in front, and covered with

silvery pubescence; the mandibles ferruginous, with their base black, sometimes yellowish in the middle. Thorax shining and finely punctured; the metathorax with a smooth shining space at its base, the sides covered with fine silky pubescence, in the centre is a longitudinal impressed line which extends from the base to the apex, at the latter it runs into a deep fossule; the tubercles and tegulæ testaceous; the wings hyaline and iridescent, with the nervures piceous; the apex of the anterior femora, the tibiæ and tarsi yellow; the base of the intermediate and posterior tibiæ, and the tarsi of the former, yellow; the apex of the intermediate and posterior tibiæ ferruginous; the tibiæ very spinose. Abdomen smooth and shining; the margin of the petiole and of one or two of the segments rufo-piceous, the apical segment ferruginous.

The *Male* differs in having the second joint of the antennæ produced into a tooth at its apex, the third very minute, the fourth considerably swollen, and as long as the fifth, which is deeply emarginate, the remainder equal; the scape yellow beneath, as well as the second joint or pedicel; the swollen portion of the fourth and the margin of the fifth fulvous, the seventh, ninth and eleventh joints white; the clypeus more produced; the ridge at the lower margin of the cheeks forming a tooth anteriorly, near the mouth; the coxæ and trochanters of the intermediate legs and the base of the coxæ and the trochanters of the posterior pair yellow; the apex of the intermediate tibiæ yellow; the basal joint of the anterior tarsi dilated on the inside, that of the intermediate pair on the outside in the middle, the posterior pair slightly curved, flat beneath, and all of them fimbriated at their sides; the posterior femora very pubescent beneath.

This species is rarely taken in the London district, but being one of those insects which burrow into the pith of brambles and rose-branches, is more readily to be obtained by collecting such sticks in the spring; by these means many apparently rare species are to be obtained in plenty. This insect usually appears in June: *Hedychrum ardens* is parasitic upon it.

B.—DIV. 2. *Abdomen subpetiolated. Ocelli in an equilateral triangle. Antennæ and tarsi simple. Base of the metathorax smooth and shining.* (Sp. 3, 4.)

3. *Crabro dimidiatus*.

C. niger, flavo-maculatus; abdomine petiolato.

- Crabro dimidiatus*, *Fabr. Ent. Syst.* ii. 298. 19 ♀; *Syst. Piez.* 313. 24.
Van d. Lind. Obs. ii. 58. 20 ♂ ♀.
Shuck. Foss. Hym. 151. 14.
Dahlb. Hym. Europ. 345. 228.
Crabro serripes, *Panz. Faun. Germ.* 46. 8.
Herr. Schöff. Cont. Faun. Germ. 179. 20.
Wesm. Hym. Foss. Belg. 128. 1.
Blepharipus pauperatus, *St. Farg. Ann. Soc. Ent. Fr.* iii. 733. 5;
Hym. iii. 138. 5.

Female. Length 4–6 lines.—Black; head smooth, shining, and slightly pubescent; a short carina between the posterior ocelli and a longitudinal line in front of the anterior one, which runs into the abrupt canaliculation of the face; the anterior and lateral margins of the vertex next the eyes elevated; the scape yellow, with a black stain behind; the inner orbits and lower portion of the cheeks and the clypeus covered with a dense silvery pile; the clypeus frequently more or less yellow at the base, the centre with a longitudinal carina; the mandibles yellow in the middle, with their apex rufo-piceous, the yellow spot sometimes wanting. Thorax finely and thickly punctured; the mesothorax with a central impressed line extending to the disk; the scutellum frequently with a yellow dot on each side, the post-scutellum usually yellow; the metathorax with a smooth shining subcordate space at its base, enclosed by a concute incisure, and having a longitudinal impressed line in the middle, which dilates beyond it into a fossule; the sides with a hoary pubescence; a transverse line on the collar yellow; the wings slightly coloured, the nervures and tegulæ piceous; the base and apex of the intermediate and posterior coxæ rufo-piceous; the apex of the trochanters and the tibiæ yellow, the latter with a black stain beneath; the tarsi rufo-piceous, with their basal joint yellow; the anterior tarsi ciliated on the exterior; all the tibiæ spinose. Abdomen elongate-lanceolate, with five broad yellow bands variously interrupted, sometimes very slightly so, the two apical segments yellow; the band on the third segment sometimes wanting.

The *Male* has the antennæ simple, slender, and the scape fimbriated beneath, with a yellow line at the sides; the thorax usually without yellow markings, but sometimes having a yellow spot on each side of the collar; the anterior femora rufo-piceous at their base and within, the intermediate pair with a testaceous streak inside and outside; the anterior tibiæ yellow above, the intermediate on the exterior, and the posterior at the knees and sometimes at the apex on the exterior, and the tarsi, rufo-piceous; the anterior femora compressed and dilated

behind, their tibiæ dilated angularly behind about the middle, and irregularly concave beneath; the intermediate femora concave beneath, and their tibiæ excised irregularly on the exterior with a pale dilatation extending along their margin; the posterior coxæ with a spine towards their base below, and the femora slightly flattened within; their tibiæ clavate; the abdomen less coloured with yellow than the female, sometimes with merely a band on the first segment and two dots on the second, a widely interrupted band on the third, a spot on the fourth, and a spot or two in the middle of the sixth; the anus flavo-ferruginous.

This species does not occur near London, but has been taken in Kent and Surrey. In the North it is very plentiful. In July 1852 I found it in abundance near Wakefield in Yorkshire.

4. *Crabro signatus*.

C. niger; thorace maculato; scutello bipunctato; abdomine segmentis tribus ultimis flavis.

Crabro signatus, Panz. *Faun. Germ.* 55. 15 ♀.

Herr. Schäff. Faun. Germ. 179. 22. 43.

Wesm. Hym. Foss. Belg. 128. 2.

Female. Length 5-6 lines.—Black; head smooth and shining; the vertex with a depression on each side of the ocelli, which is divided by an oblique longitudinal carina; the scape yellow; the clypeus covered with silvery pubescence; the mandibles yellow, with the apex fuscous. Thorax: an interrupted line on the collar, the tubercles and post-scutellum, yellow, with two yellow spots on the scutellum; legs yellow, with their base and apex more or less black. Abdomen petiolated, the petiole with a black lanceolate stripe above; the second segment black, with a yellow macula on each side posteriorly; the third segment black at the base, the rest yellow.

Male. Length 4 lines.—Black; very smooth and shining, impunctate; the vertex with irregular depressions; the inner orbit of the eyes and the clypeus covered with silvery pubescence; the scape and mandibles yellow; the apex of the latter ferruginous, the palpi pale testaceous. Thorax: an interrupted line on the collar; the legs yellow; the posterior coxæ and tibiæ black—not the trochanters; the posterior tibiæ with a minute tooth at their base beneath; the intermediate femora have a black line above and beneath; all the tibiæ without spines; the apical joints of the tarsi rufo-piceous; wings hyaline and iridescent. Abdomen petiolated, with a yellow spot on each

side at the apex of the first segment; the third and fourth segments with an ovate macula on each side; the apical margin of the sixth segment yellow, the extreme apex ferruginous.

The only sex which I have seen is the male; it was captured by Mr. Dossetor, in Cline Wood, near Swansea. It is undoubtedly the *C. signatus* of Wesmael, and I believe also of Panzer; it is very much like *C. dimidiatus*; but the unarmed tibiæ, and the spine on the femora beneath, at their base, readily distinguish it. The description of the female is from Panzer and Wesmael.

C.—DIV. 3. *Abdomen subsessile. Ocelli in an equilateral triangle.*

* *Antennæ and tarsi simple. Base of the metathorax striated. (Sp. 5-9.)*

5. *Crabro luteipalpis.*

C. niger, elongatus; metathorace antice oblique striato; mandibulis flavis aut piceis; tibiis duabus anticis subtus flavis; mandibulis palpisque flavis aut piceis. *Mas.*

C. mandibulis apicibus rufo-piceis; tibiis anticis subtus testaceis. Fæm.

Crossocerus luteipalpis, St. Farg. Ann. Soc. Ent. Fr. iii. 785. 23; Hym. iii. 785. 23 ♂.

Crabro elongatulus, Van d. Lind. Obs. ii. 62. 25.

Shuck. Foss. Hym. 154. 16.

Dahlb. Hym. Europ. i. 315. 196 ♂ ♀.

Wesm. Hym. Foss. Belg. 138. 18.

Crabro luteipalpis, Shuck. Foss. Hym. 155. 17 ♂.

Crabro hyalinus, Shuck. Foss. Hym. 161. 21 ♀.

Crabro scutellaris, Smith, Append. Cat. Brit. Ins. p. 121 ♀.

Female. Length 3 lines.—Black; shining and finely punctured; an impressed line between the stemmata, not passing beyond them; on each side of the posterior ones a smooth, shining, oblique depression; the anterior one has in front an obsolete impressed line; the scape of the antennæ at its base in front, and at the sides, fulvescent; the tips of the mandibles ferruginous; the palpi pale testaceous, dusky towards their base; the inner orbit of the eyes and the clypeus covered with silvery pubescence; the cheeks pubescent. Thorax: the metathorax with a cruciform consute incisure, the transverse one curved, enclosing the anterior portion of the metathorax, which is convex, smooth and shining, and delicately striated obliquely; the posterior portion transversely striated; the wings hyaline and iridescent; the nervures and tegulæ piceous; the knees and anterior tibiæ in front, and tarsi at their apex, obscurely

rufo-piceous; the calcaria testaceous. Abdomen subclavate, smooth and shining; the sides and fifth segment with a fine silky white pubescence; the apical segment obscurely ferruginous, punctured, carinate at the sides.

The *Male* differs in having the mandibles and palpi yellow, sometimes pale, scarcely yellow, and the scape sometimes slightly yellow at the sides; the anterior and intermediate femora, as well as the anterior tibiæ, yellow in front; the enclosed portion of the metathorax obliquely striated, and the margin of the two basal segments of the abdomen constricted.

This species is plentiful in the London district; it frequently burrows into the mortar of old brick-walls; it provisions its nest with the *Rose-Aphis*. I took both sexes in their nests, the species being abundant in my own garden. The female is undoubtedly the *C. hyalinus* of Shuckard, the type of which is in the British Museum.

6. *Crabro proximus*.

C. niger, *elongatus*; metathorace antice oblique striato; mandibulis testaceis; tibiis (quatuor anticis extus nigris) tarsisque flavis. *Mas.*

Crabro proximus, *Shuck. Foss. Hym.* 156. 18.

Smith, Cat. Brit. Hym. 29. 20.

Crabro elongatulus, *Dahlb. Hym. Europ.* i. 316. var. *δ. ♂ ♀*.

Male. Length $2\frac{1}{2}$ lines.—Black; head and thorax punctured and shining; an oblique smooth depression on each side of the posterior stemmata, and a longitudinal impression between them, extending just beyond; another in front reaching the face, which is canaliculated; the scape yellow in front, the clavolet fimbriated beneath; the inner orbits of the eyes and the clypeus covered with a dense silvery pubescence; the mandibles testaceous in the middle, with their apex rufescent. Thorax: the mesothorax with two central parallel obsolete carinæ, extending to the disk; the metathorax with a consute cruciform incisure, its anterior portion obliquely striate, the posterior transversely so; a minute spot on each side of the collar, and the tubercles, yellow; the wings hyaline and iridescent, the nervures and tegulæ testaceous; the legs yellow, with the anterior femora behind, and the intermediate and posterior ones with a litura at their apex beneath, and the posterior ones, excepting a ring at their base, black; the tarsi, with their apical joints, rufo-piceous; the posterior ones, with the basal joint, and the base of the second only, yellow, the rest piceous.

Abdomen subclavate, subpubescent, and shining; the apical segment flavo-testaceous.

The *Female* not known.

Dahlbom considers this species a variety of *C. elongatulus*; but in this opinion I do not coincide, having taken numbers of the latter from their nests. I have found little variation in their colouring; the palpi are more yellow in some than in others; but I have never found the legs and tarsi ornamented with yellow as in this species.

7. *Crabro varius*.

C. niger, elongatus; thorace flavo-maculato; metathorace antice oblique striato, peristethio denticulo armato.

Crossocerus varius, *St. Farg. Ann. Soc. Ent. Fr.* iii. 775. 12; *Hym.* iii. 179. 12.

Herr. Schöff. Faun. Germ. 181. 48. 4. t. 23 a.

Wesm. Hym. Foss. Belg. 137. 15.

Crabro spinipectus, *Shuck. Foss. Hym.* 163. 23.

Dahlb. Hym. Europ. i. 327. 215 (not var. *b* and *c*).

Female. Length 3 lines.—Black; smooth and shining; the head with scattered minute punctures; on each side of the posterior stemmata a smooth space, and between them a deep longitudinal impression which extends a short distance behind them, another in front of the anterior stemma extending to the face, which is smooth, shining, and canaliculated; the scape yellow at the sides; the inner orbit of the eyes and the clypeus covered with a dense silvery pubescence; the clypeus carinated in the centre; the apex of the mandibles rufescent. The thorax loosely punctured; at the base of the mesothorax two central, parallel, longitudinal impressions which extend to the disk, and an obsolete, abbreviated, longitudinal carina on each side of them; the metathorax with a cruciform consute incisure, widest at the base of the metathorax, the transverse one curving upwards and enclosing the anterior portion, which is finely and obliquely striated, the striae sometimes obsolete; the posterior portion of the metathorax obliquely striated, sometimes only at the apex, its base being punctured; the posterior portion of the mesothorax beneath having on each side a large, acute tooth; the collar with an interrupted band, or sometimes a dot on each side, yellow; the wings hyaline and iridescent, with a cloud beyond their middle, the nervures piceous; the anterior tibiae in front, and the intermediate and posterior pairs with a ring at their base, yellow; the ring sometimes wanting

on the intermediate pair, and sometimes a yellow spot at their apex beneath; the tarsi piceous, with their basal joint pale; the calcaria yellow testaceous, and all the tibiæ spinose. Abdomen subclavate, shining, and subpubescent, the margins of the segments sometimes piceous.

The *Male* only differs in having the antennæ fimbriated beneath, and in having a yellow spot on the scutellum; the anterior femora yellow above and behind, testaceous in front and black beneath, their tibiæ black beneath; the intermediate femora with a yellow stripe above and in front, and their tibiæ with merely a black stain behind; the anterior and intermediate tarsi with their terminal joint piceous, and a piceous spot on the basal joint of the anterior ones; the posterior legs like the female; the abdomen longer and narrower.

This species is not uncommon; it occurs about London, and in many other localities. I have captured it conveying gnats to its burrow, in a bank of very hard fine sand, near Gravesend. Wesmael thinks the female described belongs to *C. palmipes*; but, according to his own showing, in this he is certainly mistaken, as in all the specimens which I have seen (some from Shuckard himself included), the anterior calcaria are pale yellow, not black, as in *C. palmipes*; but this is not pointed out in Shuckard's Essay.

8. *Crabro transversalis*.

C. niger, elongatus; metathorace antice transverse striato.

Crabro transversalis, Shuck. Foss. Hym. 162. 22.

Dahlb. Hym. Europ. i. 317. 197.

Male. Length $2\frac{1}{4}$ lines.—Black; thickly punctured; a longitudinal impressed line between the posterior stemmata, passing a little beyond them; another in front of the anterior stemma, extending to the face, which is canaliculated, smooth, and shining; the antennæ with the scape fulvous at the side, and the clavolet fimbriated beneath; the inner orbit of the eyes and the clypeus (which is carinated in the centre and tridentate in front) covered with a dense silvery pubescence; the mandibles of a testaceous yellow, with their apex rufescent. The thorax thickly punctured; the metathorax with a cruciform consute incisure, the longitudinal one widest at the base of the metathorax, narrowing towards the centre, just beyond which it dilates into a broad fossulet, the transverse one bending upwards and enclosing its anterior portion, which, as well as the posterior, is transversely striated; the collar with two small pale

spots; the wings hyaline and iridescent, the nervures and tegulæ piceous; the anterior and intermediate femora beneath, the anterior tibiæ in front, a stain at the knee of the intermediate pair, and a ring at the base of the posterior ones, yellow; the tarsi piceous. The abdomen smooth, shining, and subclavate.

No locality is known for this species: it is unique in the collection of Mr. Westwood.

9. *Crabro vestitus*.

C. niger, flavo-maculatus; metathorace rugoso, capite thoraceque subtus pilis longis vestitis.

Male. Length 4 lines.—Black; head and thorax subopaque, closely and strongly punctured; the face canaliculated, smooth and shining, the inner orbits of the eyes and the clypeus densely covered with silvery pubescence; the cheeks have also a thin silvery pubescence, that on the vertex is fuscous; the scape yellow, with a dark stain behind; the flagellum fulvous beneath; the mandibles ferruginous at their apex. Thorax: an interrupted line on the collar, and the tubercles, yellow; the subcordiform space at the base of the metathorax longitudinally grooved, beneath which it is coarsely and transversely striated; the wings slightly coloured, the nervures and tegulæ rufo-testaceous; the sides and the mesosternum covered with long griseous pubescence, that on the disk of the thorax is short and fuscous; the anterior femora yellow, with a rufo-piceous stain behind at their base; the intermediate pair yellow above and at their apex beneath; the tibiæ and tarsi yellow, the former with more or less of a rufo-piceous stain beneath, the claw-joint of the tarsi rufo-piceous; the posterior femora with short silvery pubescence within, the tibiæ slightly spinose. Abdomen with five yellow bands, the second slightly interrupted; sometimes the first also, the third rarely so.

I believe this to be undescribed. I captured three specimens of the male in Yorkshire: the female I do not know.

** *Antennæ and tarsi simple. Base of the metathorax smooth and shining.* (Sp. 10-21.)

10. *Crabro leucostoma*.

C. niger; antennarum scapo tantum a latere flavo signato; metathorace lævi.

Sphex leucostoma, *Linn. Faun. Suec.* 414. no. 1663; *Syst. Nat.* i. 946. 36.

Villers, Ent. iii. 273. 13.

Crabro leucostoma, *Fabr. Syst. Ent.* 376. 43; *Mant.* i. 297. 27; *Ent. Syst.* ii. 301. 27.

Rossi, Faun. Etrus. ii. 91. 882.

Christ. Hym. 262.

Oliv. Encycl. Méth. vi. 518. 35.

Van d. Lind. Obs. ii. 61. 24.

Shuck. Foss. Hym. 153. 15.

Zett. Ins. Lapp. 444. 9.

Dahlb. Hym. Europ. 341. 228.

Herr. Schöff. Faun. Germ. 48. 56.

Wesm. Hym. Foss. Belg. 133. 11.

Pemphredon leucostoma, *Fabr. Syst. Piez.* 314. 1.

Crabro bidens, *Halid. Ent. Mag.* i. 516 ♂.

Crossocerus leucostoma, *St. Farg. Hym.* iii. 180. 13.

Female. Length 4-5 lines.—Black; the head shining; the vertex with several irregular depressions and a few minute scattered punctures; a deep longitudinal impression in front of the anterior stemma, extending to the face, which is canaliculated, smooth and shining; the side of the scape with a yellow line; the inner orbit of the eyes and the clypeus covered with silvery pubescence; the tips of the mandibles piceous. The thorax smooth and shining, with a few scattered minute punctures; the mesothorax with two central parallel impressed lines running to the disk; the metathorax with a deep longitudinal central incisure, the subcordiform space at its base smooth and shining, the line by which it is enclosed subdefined, sometimes very indistinct, beyond it is minutely punctured; the mesosternum has on each side, behind, a minute tooth; the tegulæ and nervures piceous; the wings hyaline and iridescent, with a fuscous cloud beyond their centre; the posterior tibiæ subclavate; the tarsi generally piceous, the anterior pair slightly ciliated; the intermediate and posterior tibiæ spinose. Abdomen shining, with the margins of the apical segments sometimes piceous, the apex ferruginous.

Male. Length 3-4 lines.—The antennæ simple, the clavolet fimbriated beneath; the clypeus with a strongly produced tooth on each side: otherwise like the female.

This species is universally distributed over the country; it burrows in decayed wood, particularly the dead parts of trees, furnishing its nest with various species of Diptera.

11. *Crabro anxius*.

C. niger; metathoracis basi lævi; metasterno denticulato; abdomine ovato-conico.

Crabro exiguus, Shuck. *Foss. Hym.* 174. 32 (nec Van d. Lind.).

Dahlb. Hym. Europ. i. 326. 214.

Crabro anxius, Wesm. *Hym. Foss. Belg.* 137. 16.

Female. Length 2-2½ lines.—Black; head smooth and shining, with scattered minute punctures; an oblique smooth depression on each side of the posterior stemmata, with a longitudinal impression between them extending a little beyond, and another in front of the anterior one extending to the face, which is canaliculated, smooth and shining; the scape yellow in front; the inner orbit of the eyes and the clypeus (which is carinated in the centre) covered with a dense silvery pubescence; tips of the mandibles rufo-testaceous; the palpi pale. Thorax shining, finely punctured; the mesothorax has two central parallel impressions which extend to the disk, with an abbreviated one on each side of them; the subcordiform enclosed space at the base of the metathorax smooth and shining, with a central longitudinal incisure, the impression enclosing the space consute; the posterior portion of the metathorax smooth and shining, the lateral margins with raised ridges; the mesosternum with a minute tooth on each side behind; the collar with sometimes a yellow spot on each side; the tegulæ testaceous; the base of the wings, which are hyaline and iridescent, yellowish, their apex slightly clouded beyond the middle, the nervures piceous; the anterior and intermediate tibiæ in front, and a ring at the base of the posterior ones, yellow; the tarsi rufo-piceous, with their basal joint pale; the anterior pair slightly ciliated, the tibiæ spinose. Abdomen elongate-ovate, smooth and shining; the margins of the posterior segments piceous, the tip of the apical one ferruginous. The thorax beneath and the sides of the abdomen with a fine silvery pubescence.

The *Male* differs in usually wanting the yellow spots on the collar; the intermediate femora with a yellow stain beneath, and the yellow ring at the base of the posterior tibiæ smaller; the four anterior tarsi piceous; the posterior pair sometimes entirely black, occasionally pale at their base.

M. Wesmael, from an examination of the typical specimen described by Van d. Linden, proves that Shuckard's insect cannot be the *C. exiguus*, and for which he proposes the name

adopted; the apical segment of the *C. exiguus* has the upper surface triangular and punctured.

12. *Crabro podagricus*.

C. niger; abdomine clavato; metathoracis spatio subcordiformi, lævi; tibiis posticis valde incrassatis; metasterno denticulo armato.

Crabro podagricus, *Van d. Lind. Obs.* ii. 60. 23.

Shuck. Foss. Hym. 157. 19.

Wesm. Hym. Foss. Belg. 130. 5.

Crossocerus podagricus, *St. Farg. Ann. Soc. Ent. Fr.* iii. 786. 24;

Hym. iii. 189. 23.

Female. Length $2\frac{1}{4}$ – $3\frac{1}{4}$ lines.—Black; head smooth and shining, a longitudinal impression extending from the anterior stemma to the face, which is canaliculated; the scape yellow, with a black line behind; the inner orbit of the eyes and the clypeus covered with a dense silvery pubescence; the tips of the mandibles ferruginous, the palpi pale testaceous. Thorax: the mesothorax very closely and delicately punctured, with two central and two lateral longitudinal impressed lines extending to the disk; the enclosed subcordiform space at the base of the metathorax shining and very delicately punctured at the sides, the line of enclosure consute; a longitudinal impressed line down the centre, broad at the base, narrowing and becoming nearly obsolete at the apex of the enclosed space, beyond which it again widens into a deep fossulet; the posterior portion of the metathorax punctured above and transversely striated below; the mesosternum has behind on each side a minute tooth; the collar with sometimes a dot on each side, and the base of the wings, yellow; the wings iridescent, the nervures and tegulæ piceous; the anterior legs with the knees and tibiæ in front and above, the intermediate tibiæ above, and the posterior ones with a yellow ring at their base; the anterior and intermediate tarsi yellow at their base, their apex rufo-piceous; the posterior pair piceous, the anterior ones slightly ciliated, and the intermediate and posterior tibiæ slightly spinose, the latter pair much thickened on their exterior towards the apex. Abdomen clavate, smooth and shining; the apical segment pinched at the sides, forming a trilobate concavity above, the apex rufescent.

Male.—A little smaller than the female, and differing in having the anterior femora yellow inside and testaceous above, with the posterior margin beneath fimbriated; the intermediate

femora also fimbriated beneath at their base, yellow testaceous within, with a yellow or testaceous stain behind; the anterior tarsi fimbriated on the edges, and as well as the intermediate pair yellower than in the other sex; the abdomen narrower and more elongate.

An abundant species, widely distributed. This insect provisions its nest with a small species of gnat.

13. *Crabro Walkeri*.

C. niger, orbitis internis oculorum mandibulisque flavis; metathorace lævi; abdomine ovato-conico.

Crabro Walkeri, Shuck. Foss. Hym. 170. 29.

Wesm. Hym. Foss. Belg. 140. 20.

Crabro aphidium, Dahlb. Hym. Europ. i. 368. 189 (nec *St. Farg.*).

Male. Length 3 lines.—Black; shining and loosely punctured; a delicately impressed line between the posterior stemmata extending beyond them, and a deeper one in front of the anterior one reaching to the face, which is slightly canaliculated, smooth and shining, with a yellow line at the inner orbit of the eyes; the clypeus yellow and slightly convex, very much produced in the centre in front, and densely covered with silvery pubescence; the scape yellow, with a black line behind; the mandibles yellow, with their apex rufescent; the palpi pale testaceous. Thorax shining and finely punctured; the metathorax with a smooth, shining, cordate space at its base, the sides of which in front have a few delicate curved striæ; in its centre is a longitudinal incisure, which, as well as that which encloses it, is crenate; the metathorax transversely striated behind; a spot on each side of the collar, and the tubercles, yellow; the wings hyaline and iridescent, the nervures piceous, the tegulæ testaceous; the legs yellow, the anterior femora with a black stain behind and ferruginous beneath, the tibiæ with a black stain below; the intermediate femora behind and the tibiæ beneath with a black stain; the posterior femora black, the tibiæ with a black stain at the apex above; the anterior and intermediate tarsi pale yellow, with the claw-joints rufo-piceous; the posterior tarsi piceous, with their basal joint yellow. Abdomen elongato-conical and subpubescent; the margins of the segments testaceous, the tip of the apical segment ferruginous.

This species is unique in the Shuckardian Collection, in the possession of T. Desvignes, Esq. Its precise locality is not known.

14. Crabro Wesmaeli.

C. niger; thorace flavo-maculato, metathorace lævi.

Crabro Wesmaeli, *Van d. Lind. Obs.* ii. 63. 26.

Shuck. Foss. Hym. 164. 24.

Dahlb. Hym. Europ. i. 312. 192.

Wesm. Hym. Foss. Belg. 137. 17.

Crossocerus Wesmaeli, *St. Farg. Ann. Soc. Ent. Fr.* iii. 783. 20;

Hym. iii. 186. 19.

Female. Length 2-3½ lines.—Black; head shining and delicately punctured; a slight longitudinal channel between the stemmata, which does not extend beyond them; on each side of them an oblique smooth depression; an impressed line in front of the anterior stemma which extends to the face, which is canaliculated, smooth and shining; the inner orbit of the eyes, the lower portion of the cheeks, and the clypeus densely covered with silvery pubescence, the clypeus carinated in the centre; the scape yellow beneath, its extreme apex, as well as that of the pedicel, ferruginous; the mandibles testaceous or yellow in the middle, with their apex ferruginous. Thorax shining and delicately punctured; the metathorax with a consute cruciform incisure, the transverse one curving upwards and enclosing a smooth shining space; the posterior portion with minute scattered punctures; the collar with a transverse band, sometimes interrupted, the tubercles, extreme base of the wings, and a spot on the scutellum, yellow; the wings hyaline and iridescent, their nervures piceous, the tegulæ rufo-piceous; the tibiæ yellow, the anterior and intermediate pair black beneath, as well as the apical half of the posterior pair; the tarsi rufo-testaceous, with their base more or less yellow; the anterior pair ciliated exteriorly, and all the tibiæ spinose. Abdomen elongate-ovate, the basal segment narrowed into a petiole; the apical segment coarsely punctured, the tip ferruginous; the sides of the abdomen and the fifth segment finely pubescent.

The *Male* differs in having the antennæ and mandibles black; in sometimes wanting the yellow spots on the collar; the abdomen being more elongate, and not ferruginous at the apex.

This species is occasionally met with in the London district, but is apparently much more abundant in the North; I captured it in Yorkshire in the month of July, and on one occasion observed it at Charlton near Greenwich, burrowing in a bank of fine sand, furnishing its nest with minute species of Diptera belonging to the genera *Phytomyza* and *Notiphila*: I found it very abundant at Pakefield, near Lowestoft, Suffolk, in August 1859.

15. *Crabro capitosus*.

C. niger; capite quadrato; abdomine clavato; metathorace lævi; tibiis posticis valde incrassatis.

Crabro capitosus, *Shuck. Foss. Hym.* 159. 20.

Dahlb. Hym. Europ. i. 317. 198.

Westm. Hym. Foss. L'g. 129. 3.

Crabro lævipēs, *Herr. Schöff. Faun. Germ.* 181. 63.

Female. Length $3\frac{1}{2}$ lines.—Black; head subquadrate, wider than the thorax, smooth and shining; a slightly impressed line between the antennæ passing a little beyond them, a deeper line in front extending to the face, which is canaliculated; the base and apex of the scape, and the apical joints of the flagellum, rufo-piceous beneath; the inner orbit of the eyes and the clypeus covered with silvery pubescence, the latter produced in the centre in front into a tooth; the mandibles rufo-piceous at their apex. Thorax shining; the mesothorax and scutellum with a few delicate scattered punctures, the former with two central parallel impressed lines at the base, extending to the disk; the metathorax smooth and shining, consute at the base, with a faint longitudinal line which deepens beyond the middle, the anterior portion not distinctly enclosed; the tegulæ rufo-piceous, the wings hyaline and iridescent, the nervures piceous; the anterior tibiæ yellow in front, the intermediate pair fuscous at their base and apex; the posterior coxæ pale testaceous at their apex, their tibiæ subclavate and with a pale yellow ring at the base; the anterior and intermediate tarsi pale yellow at the base and rufo-piceous at their apex, the posterior pair entirely rufo-piceous; the legs simple, covered with fine hoary pile. Abdomen clavate, smooth and shining, the first segment much narrowed at the base; the apical segment concave above, its apex rufescent.

This species has been taken in the London district, and also in Yorkshire; but it is apparently rare.

16. *Crabro bimaculatus*.

C. niger; clypeo flavo-maculato; metathorace lævi.

Crossocerus bimaculatus, *St. Farg. Ann. Soc. Ent. Fr.* iii. 788. 25; *Hgm.* iii. 191. 25 ♂.

Crabro geniculatus, *Shuck. Foss. Hym.* 169. 28 ♀.

Crabro bimaculatus, *Dahlb. Hym. Europ.* i. 310. 190 ♂ ♀.

Female. Length $3\frac{1}{2}$ lines.—Black; the head punctured and

shining; an impressed line in front of the anterior stemma, extending to the face; the inner orbit of the eyes and the clypeus densely covered with silvery pubescence, the latter with a large yellow spot in the centre; the scape yellow, with a black stripe behind; the apex of the mandibles ferruginous; the palpi pale testaceous. Thorax punctured and shining; the mesothorax with a central longitudinal line extending from the base to the apex; the metathorax with a smooth enclosed subcordiform space at its base, which has in the centre a longitudinal consute incisure; the posterior portion very slightly striated transversely; the wings slightly coloured, the nervures and tegulæ rufo-piceous; the legs yellow, with the femora, the anterior and intermediate tibiæ beneath, and the posterior ones with their apical half, black; the terminal joint of the anterior and intermediate tarsi piceous; the posterior tarsi piceous, with the basal joint yellow; the anterior tarsi slightly ciliated, the posterior tibiæ spinose. Abdomen shining and pubescent, with the margins of the segments and the apex piceous; the apical segment pinched at the sides, with the margin raised.

The *Male* has the antennæ nigro-fuscous, the scape yellow in front; the clypeus carinate in the centre, with a yellow spot on each side at the base, the apical margin crenulated or subdenticulate, the denticulations being six in number; the mandibles black at the base, then fulvous, with the apex rufo-piceous; the legs, with the coxæ, trochanters and femora rufo-piceous at their apex; the tibiæ yellow, with their apex black: in other respects resembling the female.

This insect was captured by the late Mr. James Francis Stephens, at Ripley in Surrey: no other locality is known.

17. *Crabro pubescens*.

C. niger, elongatus; capite et thorace pilis longis vestitis; metathorace lævi.

Crabro pubescens, Shuck. Foss. Hym. 165. 25.

Dahlb. Hym. Europ. i. 311. 191.

Crabro diversipes, Herr. Schöff. Faun. Germ. 181. 49 ♂ ♀.

Wesm. Hym. Foss. Belg. 134. 12.

Male. Length 3 lines.—Black; the head shining, very delicately punctured, the surface irregular; an impressed longitudinal line in front of the anterior stemma extending to the face; the head thinly covered with long pubescence; the face canaliculated, smooth and shining; the antennæ fimbriated beneath, with the sides of the scape yellow; the inner orbit of

the eyes and the clypeus covered with a dense silvery pubescence; the tips of the mandibles rufo-piceous. Thorax shining and delicately punctured; the collar and mesothorax thinly covered with long black pubescence; the metathorax with a smooth shining subcordiform space at its base, which is divided from the posterior portion by a short transverse consutural incisure, the sides not being distinctly enclosed; down the centre is a deep longitudinal incisure, which dilates beyond the transverse one into a deep fossulet, at the sides of which it is smooth and shining; the wings hyaline and iridescent, with the nervures and tegulæ piceous; the anterior tibiæ fulvous within; the intermediate femora with a fuscous stripe in front and behind; the tarsi piceous; the anterior tibiæ and tarsi densely fimbriated on the exterior; the legs sometimes entirely dark testaceous. Abdomen elongate-ovate, subpubescent and shining, with the margins of the three basal segments depressed.

The typical specimen of this species, formerly in the collection of Mr. James Francis Stephens, is now in the British Museum: its locality is not known.

18. *Crabro obliquus*.

C. niger, *elongatus*; metathoracis spatio subcordiformi disco tantum lævi, limbo oblique striato.

Crabro obliquus, *Shuck. Foss. Hym.* 167. 26.

Dahlb. Hym. Europ. i. 315. 196.

Female. Length $2\frac{1}{2}$ – $3\frac{1}{4}$ lines.—Black; head subquadrate, the vertex minutely and closely punctured; on each side of the posterior stemmata is a smooth shining depression, and between them a longitudinal impressed line which extends a little beyond them; in front of the anterior stemma is a deeply impressed line which extends to the face, which is canaliculated, smooth and shining; the scape yellow on each side; the inner orbit of the eyes and the clypeus densely covered with silvery pubescence, the latter carinated in the centre; the mandibles ferruginous at their apex, sometimes yellow in the middle; the palpi pale testaceous. Thorax densely covered with minute punctures; the mesothorax with two central, parallel, slightly elevated lines at its base, extending to the disk, and two lateral ones much shorter; the metathorax with a cruciform consutural incisure, the transverse one curved upwards and enclosing the anterior portion of the metathorax; the disk smooth and shining, the sides of the enclosure obliquely striated; the posterior portion of the metathorax transversely striated; the collar yellow,

more or less interrupted in the middle ; the wings hyaline and iridescent, with a faint cloud beyond the middle, the tegulæ and nervures piceous ; the anterior tibiæ in front, and the intermediate and posterior ones at the knees, yellow ; the tarsi piceous, the basal joint of the intermediate and posterior pairs pale at the base ; the intermediate and posterior tibiæ spinose. Abdomen shining and finely punctured, the sides and the fifth segment with a delicate silvery down ; the apical segment strongly punctured, the lateral margins raised, the extreme apex rufescent.

The *Male* differs in having the antennæ fimbriated beneath, and the scape yellow in front ; the anterior and intermediate tibiæ yellow in front, and the posterior pair at their base.

This species is abundant about London ; it has also been taken at Loch Rannoch in Perthshire.

19. *Crabro pallidipalpis*.

C. niger, elongatus ; metathorace lævi.

Crossocerus pallidipalpis, *St. Farg. Ann. Soc. Ent. Fr.* iii. 779. 15 ; *Hym.* 182. 15.

Crabro propinquus, *Shuck. Foss. Hym.* 168. 27.

Female. Length 3-3½ lines.—Black ; head shining and minutely punctured ; a delicately impressed line between the stemmata which passes just beyond them, and a deeper one in front of the anterior stemma which extends to the face ; the inner orbit of the eyes, the clypeus, and lower portion of the cheeks covered with a silvery pubescence ; the scape with a yellow line outside ; the apex of the mandibles rufo-piceous. Thorax shining and minutely punctured ; the mesothorax with two central parallel longitudinal lines at the base which extend to the disk, and two shorter lateral ones ; the metathorax smooth and shining, with a cruciform consute incisure, the transverse one curving upwards ; the posterior portion beyond the enclosed space with scattered punctures ; the collar with usually a pale yellow dot on each side ; the wings slightly coloured, the nervures and tegulæ piceous ; the anterior tibiæ in front, and the intermediate and posterior pairs at their base, yellow ; the tarsi rufo-piceous, the posterior pair with their extreme base paler. Abdomen subclavate and slightly pubescent, the apex piceous.

The *Male* differs in having the antennæ fimbriated beneath, and the intermediate tibiæ yellow in front.

Occurs occasionally in the London district, and has been taken at Lowestoft, Suffolk.

20. *Crabro vagabundus*.

C. niger, flavo-maculatus; metathorace lævi. *Fæm.*

C. femoribus anticis subtus spina obtusa armatis. Mas.

Crabro vagabundus, Panz. Faun. Germ. 53. 16 ♂.

Van d. Lind. Obs. ii. 57. 18.

Shuck. Foss. Hym. 149. 13.

Weesm. Hym. Foss. Belg. 132. 8.

Blepharipus mediatius, St. Farg. Ann. Soc. Ent. Fr. iii. 735. 6;

Hym. iii. 140. 6 ♀.

Blepharipus 5-maculatus, St. Farg. Ann. Soc. Ent. Fr. iii. 738. 9;

Hym. iii. 144. 9 ♂.

Herr. Schöff. Faun. Germ. 179. 39.

Crabro subpunctatus, Dahlb. Hym. Europ. i. 349. 229.

Crabro 4-cinctus, Dahlb. idem, 526. 32 ♀.

Female. Length $4\frac{1}{2}$ – $5\frac{1}{2}$ lines.—Black; head punctured and slightly shining, an oblique impressed line extending from the posterior stemmata to the margin of the eyes; a longitudinal line in front of the anterior stemma extending to the face, which is canaliculated, smooth and shining; the clypeus and inner orbit of the eyes, as well as the lower portion of the cheeks, covered with a silvery down; the scape yellow, with a dark stain behind; the apex of the mandibles rufo-piceous. Thorax punctured, slightly shining and subpubescent; the mesothorax with a central longitudinal carina extending to the disk; the metathorax with an enclosed smooth shining space at its base, and a central longitudinal incisure; this, as well as the incisure surrounding the enclosed space, consute; the posterior portion of the metathorax transversely and finely striated; the mesosternum having on each side behind a minute tooth; the collar with a subinterrupted yellow band, and the scutellum yellow in front; the wings slightly coloured, the tegulæ and nervures rufo-piceous; the tibiæ yellow, with a black stripe beneath the anterior and intermediate pairs; the posterior pair with a piceous spot at their apex within; the tarsi fuscous, with their base pale, the anterior pair slightly ciliated on their exterior, and the intermediate and posterior tibiæ slightly spinose. Abdomen with five yellow bands, more or less interrupted, sometimes only one or two subinterrupted, or occasionally all entire.

The *Male* has the antennæ simple, the clavolet fimbriated beneath; the yellow spots frequently wanting on the collar or scutellum, or on both; the wings with a dark stain within the marginal cell; the anterior trochanters yellow, their femora testaceous beneath and in front, and having a small produced

tooth on their exterior towards the base; the intermediate femora testaceous behind and in front; otherwise as in the female; the abdomen oblong, with seldom more than a minute spot on each side of the first segment, a band more or less interrupted at the base of the second and third, and a transverse line on each side of the fourth, a central ovate spot on the fifth, and a central transverse line on the sixth; but the markings on the first, fourth and fifth segments are sometimes wanting.

This species is not very abundant in the London district. It is widely distributed, but is much more rare than the next species.

21. Crabro 4-maculatus.

C. niger, flavo-maculatus; margine infero capitis utrinque spina armato; metathorace basi lævi.

Crabro 4-maculatus, Fabr. Ent. Syst. ii. 294. 4 ♂; Syst. Piez. 308. 4.

Spin. Ins. Lig. fasc. iii. 177. 9.

Dahlb. Hym. Europ. i. 351. 30.

Wesm. Hym. Foss. Belg. 139. 19.

Crabro mediatus, Fabr. Syst. Piez. 312. 20.

Crossocerus subpunctatus, St. Farg. Ann. Soc. Ent. Fr. iii. 766. 3;

Hym. iii. 170. 3.

Crabro subpunctatus, Van d. Lind. Obs. ii. 58. 9.

Shuck. Foss. Hym. 147. 12.

Curtis, Brit. Hym. xv. t. 6. 80 ♀.

Herr. Schöff. Faun. Germ. 181. 49. no. 8. t. 21, 22.

Blepharipus pauperatus, St. Farg. Ann. Soc. Ent. Fr. iii. 733. 5;

Hym. iii. 130. 5.

Female. Length 4–5 lines.—Black; head punctured and shining, with several irregular depressions on the vertex; a deep longitudinal depression extending from the anterior stemma to the face, where it becomes a canalicula, occupying the space between the eyes; the scape yellow in front, sometimes the base and apex of the scape merely rufo-fuscous; the clypeus strongly carinated in the centre, and thinly covered with yellowish pubescence; the mandibles fuscous, with their apex rufo-piceous, sometimes entirely piceous; the cheeks beneath armed with an acute tooth. Thorax shining and punctured; the mesothorax with three central obsolete carinæ at the base; the metathorax with a central longitudinal incisure and a curved one which encloses a semicircular space at the base, which is shining, and delicately obliquely striated, both the incisures consute; the metathorax posteriorly shining, punctured above and transversely striated below, sometimes entirely so, and en-

closed by lateral ridges ; the collar and post-scutellum with a transverse yellow line, the former generally interrupted, the latter frequently obsolete ; the wings slightly coloured, the nervures and tegulæ rufo-piceous ; the anterior and intermediate tibiæ in front, and the posterior pair with a ring at their base, yellow ; the anterior and intermediate tarsi yellow at their base, rufo-piceous at their apex, the posterior pair entirely piceous ; the anterior tarsi slightly ciliated outside, and the intermediate and posterior tibiæ spinose. Abdomen elongate-ovate, with five yellow bands ; the second, third, fourth and fifth very wide, the first four generally interrupted, the fourth frequently widely interrupted, the fifth usually entire, the second and third generally very slightly interrupted ; the apical segment with generally a yellow spot on each side, and a central one beneath.

Var. α . The clypeus with two yellow spots.

Male. Length 3-4 lines.—The antennæ with the clavolet fringed below, and the scape with sometimes a lateral yellow line ; the inner orbits of the eyes and the clypeus covered with silvery pubescence, the latter tridentate in front ; the yellow on the collar and post-scutellum generally obsolete ; the anterior and intermediate femora fuscous in front, the latter also behind ; the abdomen elongate, the first segment gradually narrowing into a petiole, and generally much less coloured than in the female, it being most frequently limited to an ovate yellow spot on each side of the base of the second and third segments, sometimes a few spots at the base of the sixth.

Var. α . The clypeus with two yellow spots, the abdomen entirely black.

Var. β . The clypeus and abdomen both entirely black.

This is one of the most abundant species of the genus ; it burrows in rotten wood, and provisions its nest with gnats and other small Diptera.

*** *Antennæ simple. Anterior tibiæ of the males dilated.*

22. *Crabro scutatus*.

C. niger ; clypeo flavo-maculato ; metathoracis basi oblique striato ; mesosterno apice denticulato. *Fæm.*

C. antennis filiformibus, tibiis scutelloque albis, apice nigris.
Mas.

Crabro scutatus, *Fabr. Mant.* i. 296. 15 ♂; *Ent. Syst.* ii. 298. 16; *Syst. Piez.* 312. 19.

Panz. Faun. Germ. 15. 22.

Van d. Lind. Obs. ii. 44. 5.

Shuck. Foss. Hym. 129. 3 ♂ ♀.

Dahlb. Hym. Europ. i. 329. 216.

Wesm. Hym. Foss. Belg. 135. 13.

Vespa scutata, *Gmelin, Syst. Nat.* i. 2763. 116.

Spheg palmaria, *Schreb. Naturf.* xx. 100. 6. t. 2. f. 9 ♂.

Crossocerus scutatus, *St. Farg. Ann. Soc. Ent. Fr.* iii. 764. 1; *Hym.* iii. 168. 1.

Male. Length 3–3½ lines.—Black, shining, sparingly punctured; an impressed line in front of the anterior stemma, extending to the base of the antennæ, another between the stemmata, not extending beyond them; the scape yellow, with a narrow piceous stripe above; the inner orbit of the eyes and the clypeus covered with silvery pubescence; the clypeus yellow, with a central longitudinal carina; the mandibles and lower portion of the cheeks yellow, with their tips ferruginous. Thorax delicately punctured; the metathorax having a cruciform consute impression and a transverse line curving upwards and enclosing a shining subcordiform space, which is obliquely striated at the lateral edges; the posterior portion of the metathorax smooth, shining, and sometimes very delicately transversely striated; the mesosternum armed on each side at its apex with a minute tooth; a transverse line on the collar, the tubercles, a large lunule below, the neck beneath, the pectus, and the scutellum in front, yellow; wings iridescent, slightly coloured towards their apex, the nervures piceous; the legs yellow, with the anterior tibiæ dilated into an ovate concavo-convex plate, covered with short white pubescence, yellow on its anterior margin, its anterior apex with a dark lunule, posteriorly pale and transparent; the first joint of the tarsi dilated into a narrow black lobe, the apical joint piceous; the intermediate femora and tibiæ piceous within; the posterior coxæ black at their base, the femora black; the tibiæ black above, except at the base; the tarsi piceous, with the base of the first joint yellow.

Female. Length 4 lines.—This sex wants the yellow colour on the cheeks, neck beneath, and on the pectus; the base of the coxæ, the trochanters, and femora are black; the apex of the coxæ fuscous; the scutellum is black, the post-scutellum yellow; two or three of the basal joints of the tarsi are pale; in other respects like the male.

This is a very local species. It is occasionally found in various localities in Kent, as Birch and Darenth Woods, settling on the

flowers of Umbelliferæ; it has also been taken at Southend, and Mr. S. Stevens took it in Devonshire. Very abundant at Pakefield near Lowestoft, Suffolk, where great numbers were taken settling on the leaves of the Coltsfoot.

23. *Crabro cetratus*.

C. niger; tibiis scutelloque parvis, nigris, margine albo.

Crabro cetratus, *Shuck. Foss. Hym.* 131. 4.

Dahlb. Hym. Europ. i. 337. 221.

Wesm. Hym. Foss. Belg. 133. 10.

Crabro dilatus, *Herr. Schöff. Faun. Germ.* 181. 54.

Crabro melanarius, *Bold, Zool.* xv. 5631.

Female. Length $3\frac{1}{2}$ –4 lines.—Black and shining; the head with very delicate shallow punctures; a deep longitudinal impression extends from the anterior stemma to the base of the antennæ; the clypeus densely covered with silvery pubescence, its margin truncate at the apex; the mandibles ferruginous at their apex and bidentate; the palpi very dark rufo-fuscous, nearly black. Thorax very delicately punctured; the metathorax not having the usual enclosed space at the base; a deep longitudinal channel runs from the base to the apex, on each side of which it is delicately obliquely rugose; the femora and tibiæ with a fine changeable pile; the posterior tibiæ clavate, with a double row of short, fine, acute spines outside; the calcaria pale rufo-testaceous, as well as the apex of the tibiæ. Abdomen clavate, the margins of the two basal segments slightly depressed; the apical segment compressed, margined at the sides, shining and punctured, with the tip ferruginous.

Male. Length $3\frac{1}{4}$ –4 lines.—Black; the head delicately punctured, with an impressed line in front of the anterior stemma extending to the sulcation of the face, another between the stemmata extending a little behind the posterior ones; the clypeus and inner orbits of the eyes covered with silvery pubescence; three or four of the basal joints of the flagellum fimbriated beneath. Thorax: the angles of the prothorax rounded; the mesothorax smooth, shining, and sparingly punctured; the metathorax gibbous, without a distinct enclosure at its base; having a central, longitudinal, consute incisure, and the lateral lobes irregularly and delicately obliquely striated; the anterior tibiæ and first joint of the tarsi dilated externally, with a pale margin; the calcaria of the posterior legs sometimes fuscous; the wings hyaline and iridescent, with the apical half faintly clouded. Abdomen shining, the centre of the segments somewhat thickened, the apical one curved downwards.

This a scarce species; it has been taken in the London district; it also occurred at Weybridge, at Bristol, and near Lannercost, in Northumberland. I was inclined to think the female was the *C. podagricus* of Dahlbom, not of Van d. Linden—the *melanarius* of Wesmael; but on receiving subsequently the other sex from Mr. Bold, I discovered the species to be the *C. cetratus* of Shuckard.

**** *Antennæ of the males with joints emarginate beneath; their tarsi simple.*

24. Crabro sexcinctus.

C. niger, flavo-maculatus; metathoracis basi rugoso; antennarum articulis subtus emarginatis; clypeo argentato. Mqs.

Crabro sexcinctus, Van d. Lind. Obs. ii. 55. 13 (nec ♀).

Herr. Schöff. Faun. Germ. 181. 18.

Shuck. Foss. Hym. 137. 8.

Wesm. Hym. Foss. Belg. 154. 34.

Male. Length 5 lines.—Black; head subquadrate, pubescent, finely and closely punctured, the vertex concave between the eyes; between the ocelli is a slightly impressed line, which extends nearly to the posterior margin of the vertex; the face canaliculated, smooth and shining; the scape yellow, with a black stain behind; the first, second, third and fourth joints of the flagellum emarginate beneath, produced into teeth at their apex, the flagellum fulvous beneath, one or two of the apical joints entirely so, the apical one black; the inner orbit of the eyes, the cheeks, and the clypeus, densely covered with silvery down, the latter carinated in the centre and terminating in front in an obtuse tooth. Thorax pubescent; the mesothorax with a central longitudinal carina, and, as well as the scutellum, longitudinally rugose; the metathorax rugose at the base and transversely striated behind; a deep groove runs down the centre, its margins ridged, about the middle it turns off on each side and curves round, enclosing a lobe; the collar has sometimes an interrupted yellow band; the wings coloured, darkest towards their apical margins; the tegulæ testaceous, the nervures piceous; the anterior femora ferruginous above and in front, and yellow beneath, their tibiæ yellow above and in front, which is slightly ferruginous at the apex; the intermediate femora with a ferruginous line above, their tibiæ yellow in front and slightly ferruginous beneath; the tibiæ yellow and ferruginous behind, with a black stripe; the anterior and intermediate tarsi reddish yellow, with the apical joint fuscous; the

basal joint of the intermediate tarsi produced beneath towards the apex, and having two stout spines. Abdomen: each segment with a yellow interrupted fascia; the fifth fascia generally entire.

Having collected these insects upwards of twenty years, and having examined hundreds of individuals without meeting with any female at all likely to belong to *C. sexcinctus*, except *C. cephalotes*, I quite agree with Shuckard that this is probably a variety of the next species. I have not bred this species or variety, but have reared *C. cephalotes* from decaying willow wood.

25. *Crabro cephalotes*.

C. niger, flavo-maculatus; clypeo aurato; mesothorace et scutello longitudinaliter rugosis; tibiis flavis, abdomineque fasciis interruptis flavis.

Crabro cephalotes, Panz. Faun. Germ. 62. 16.

Fabr. Syst. Piez. 308. 5.

Van d. Lind. Obs. ii. 55. 13.

Shuck. Foss. Hym. 135. 7.

Dahlb. Hym. Europ. i. 408. 273.

St. Farg. Hym. iii. 100. 1.

Wesm. Hym. Foss. Belg. 151. 33.

Crabro vespiformis, Van d. Lind. Obs. ii. 54. 12.

Female. Length $5\frac{1}{4}$ – $6\frac{1}{2}$ lines.—Black; head large, wider than the thorax, subquadrate, closely and finely punctured, slightly shining and pubescent, the vertex slightly depressed, the face canaliculated; the inner orbit of the eyes and the clypeus densely covered with golden pubescence; the mandibles yellow, with their apex rufo-piceous; the scape of the antennæ yellow. Thorax slightly pubescent; the mesothorax finely longitudinally strigose, the scutellum, post-scutellum, and enclosed space at the base of the metathorax similarly striated, the posterior portion of the latter transversely striated; an interrupted line on the collar, the tubercles, the tibiæ, and two basal joints of the tarsi, yellow; the apical joints of the tarsi rufo-piceous, the claw-joint darkest; the anterior tibiæ ferruginous within and black beneath; the intermediate pair with a ferruginous line beneath; the wings slightly coloured. Abdomen: each of the segments with a yellow fascia, and the sides of the apical segment yellow; all the fasciæ except the fifth more or less interrupted; the apical segment canaliculated, the sides of the channel with rigid golden setæ.

Var. 1.—A narrow interrupted line at the base of the scutellum, and the fascia on the basal segment waved.

Var. 2.—A narrow line on the scutellum; a waved line on the basal segment of the abdomen and the third fascia only, slightly interrupted.

Var. 3.—A line on the scutellum and all the fasciæ on the abdomen entire, the first with an angular projection in the middle in front, and a short line on each side of it, curving inwards.

Male.—Agreeing exactly with the description of *C. sexcinctus*, except that the pubescence which clothes the clypeus is golden-coloured.

This is an abundant species. It burrows in decaying wood, and provisions its nest with Diptera. Several varieties intervening between those given above will be met with; but the extremes are described, as far as our observation has enabled us to give them. Var. 3 was taken in the Landslip, Isle of Wight, where very large highly coloured examples were captured, some having two or four small yellow spots on the abdomen beneath.

26. *Crabro interstinctus*.

C. niger, flavo-maculatus; mesothorace punctato; antennarum articulis subtus emarginatis, abdominis segmentis quinque-punctatis.

Crabro interstinctus, Smith, Zool. ix. Append. p. cxxvi.

Crabro fossorius, Dahlb. Hym. Europ. i. 422. 276?

St. Farg. Hym. iii. 130?

Male. Length 3 lines.—Black; head subquadrate, minutely and closely punctured; the ocelli in a triangle on the vertex; a smooth impressed line runs from the anterior ocellus to a deep canalicular on the face; the clypeus carinated in the centre, and covered with silvery pubescence; the scape of the antennæ yellow towards the apex; the third and fourth joints of the flagellum deeply emarginate beneath, and produced into a tooth at their apex. Thorax: the mesothorax covered with minute elongate punctures; the metathorax rugose, with seven or eight short elevated lines at the base, a longitudinal incisure in the centre and the posterior transversely striated; the wings hyaline, the nervures and tegulæ piceous; the anterior tibiæ in front, the posterior pair above, and the anterior and intermediate tarsi, yellow. The second, third, fourth and fifth segments of

the abdomen with a small ovate yellow spot on each side, the basal margin of the sixth yellow.

Had this insect been of a larger size, I should have referred it to the *C. fossorius*, and possibly it may prove to be a small example of that species. The only specimen I have seen is in my own collection; it was taken by Mr. Hewitson, near his own residence at Weybridge; since that time he informs me he has seen other individuals about the same locality.

DIV. 4.—*Abdomen subsessile. Ocelli in an isosceles triangle.*

* *Antennæ of the males subfusiform. Anterior tibiæ of the males scutellate.*

27. Crabro cribrarius.

C. niger, flavo-maculatus; mesothoracé longitudinaliter striato. Fæm.

C. antennis subfusiformibus; tibiis scutelloque obscuris, flavo marginatis, punctis hyalinis. Mas.

Vespa cribraria, Linn. Faun. Suec. 416. 1675, & Cab. Mus. Linn. Soc.

Sphex cribraria, Linn. Syst. Nat. i. 945. 23.

Vill. Ent. iii. 234. 34.

Sulz. Gesch. Ins. t. 27. f. 6 ♂.

Schrank, Ins. Austr. 384. 779.

Christ. Hym. 281. t. 27. f. 1 ♂.

Crabro cribrarius, Fabr. Ent. Syst. ii. 299. 14 ♂; Syst. Piez. 311. 16.

Panz. Faun. Germ. 15. 18 ♂, 15. 19 ♀.

Latr. Hist. Nat. xiii. 323. 1.

Duméril, Cons. Gén. t. 31. f. 3.

Van d. Lind. Obs. ii. 40. 1 ♂ ♀.

Shuck. Foss. Hym. 126. 1.

Zett. Ins. Lapp. 444. 7.

Dahlb. Hym. Europ. i. 353. 231.

Weesm. Hym. Foss. Belg. 146. 25.

Thyreopus cribrarius, St. Farg. Ann. Soc. Ent. Fr. iii. 752. 1; Hym. iii. 158. 1.

Guépe Ichneumon, (DeGeer) Mém. ii. 810. 2. t. 28. f. 5 ♂.

Female. Length 6–7½ lines.—Black; the head slightly shining, the vertex irregularly concave, longitudinally striated in front and punctured behind; the face slightly canaliculated; the scape with usually a yellow spot at the apex behind, and very pilose; the inner orbit of the eyes and the clypeus covered with silvery pubescence; the head covered with long fuscous pubescence, that on the cheeks griseous. Thorax pilose, with

the collar smooth and shining, with a few scattered punctures; the mesothorax longitudinally striated, with a central and two lateral slight longitudinal carinæ extending to the disk; the scutellum shining, with a few scattered punctures; at the base of the metathorax, in the centre, is a small, shining, triangular rugose space, from which a longitudinal incisure runs downwards to the apex, about midway dilating into a fossule, on each side of which it is longitudinally rugose-striate; the collar with an interrupted band and a spot on the scutellum yellow, the latter sometimes obsolete; the wings hyaline, their apical margins clouded; the tibiæ and tarsi yellow, the anterior tibiæ with a black spot beneath; the apical joints of the tarsi slightly ferruginous, the anterior pair ciliated on the exterior, all the tibiæ spinose. Abdomen ovate, with five yellow bands, the second and third more or less interrupted.

Male. Length $4\frac{1}{2}$ – $7\frac{1}{2}$ lines.—The flagellum subfusiform, the first five joints concave beneath, the fifth and three following serrated on the exterior, the first and second fimbriated within; the collar longitudinally striated, as well as the scutellum; the collar sometimes has a yellow spot on each side; the anterior trochanters produced beneath at their apex into an obtuse tooth, their femora compressed, irregularly dilated behind, and having at their base a long, broad, irregular process convex above, with a transverse ridge below just beyond the middle, between which and the apex it is transversely concave, the apex itself obliquely truncated, and at the base below, in front, a long narrow spine; the anterior tibiæ dilated behind into an ovate concavo-convex plate; the tibiæ with a black or piceous litura at the knee, in front yellow, the plate slate-coloured, fusco-piceous towards the exterior margin, the margin itself testaceous, the superficies sprinkled with pale dots; their tarsi also dilated, the first irregularly triangular and concave above, and the whole tarsus longitudinally carinated below towards the front, the apical joint having the pulvillus placed near the exterior claw; the interior claw much the largest, its base below produced into a broad flat fornicate appendage, the basal joint rufo-testaceous, the rest piceous; the intermediate femora flattened within, and slightly dilated at their base behind. Abdomen subcylindrical, curved downwards at its apex, with seven yellow bands, the second and third interrupted; the band on the first segment sometimes wanting.

Abundant, and universally distributed; to be found in most sandy districts during June, July, and August. This species provisions its nest with Diptera, and burrows in the ground.

28. *Crabro patellatus*.

C. niger, flavo-maculatus; mesothorace punctato. *Fæm.*

C. antennis subfusiformibus; tibiis scutelloque obscuris, punctis
'lineisque hyalinis. *Mas.*

Crabro patellatus, *Panz. Faun. Germ.* 46. 4 ♂ & 46. 9 ♀.

Van d. Lind. Obs. ii. 43. 3.

Shuck. Foss. Hym. 128. 2.

Dahlb. Hym. Europ. i. 356. 232.

Wesm. Hym. Foss. Belg. 145. 24.

Thyreopus patellatus, *St. Farg. Ann. Soc. Ent. Fr.* iii. 756. 3; *Hym.*
iii. 161. 3.

Female. Length 5-6 lines.—Black; head pubescent and finely punctured, the vertex irregularly concave; the face smooth, shining, and canaliculated; the scape yellow beneath; the inner orbit of the eyes and the clypeus covered with dense silvery pubescence, the latter carinated in the centre; the mandibles yellowish at the base, the apex rufo-piceous at the apex. Thorax subpubescent; the mesothorax and scutellum shining, with scattered delicate punctures; the metathorax with a deep longitudinal incisure, widest at its base; a half-circular sub-enclosed space at its base, which is coarsely reticulated and shining, the posterior portion rugose, with the lateral margins raised; the collar with sometimes a yellow spot on each side, and sometimes the tubercles yellow, occasionally a spot on the scutellum; the wings fusco-hyaline, with a darker cloud at their apical margins, the nervures and tegulæ rufo-testaceous; the tibiæ and tarsi yellow, the anterior and intermediate tibiæ black beneath, the posterior pair ferruginous at their apex within; the tarsi ferruginous, with their basal joint yellow; the anterior tarsi ciliated exteriorly, and all the tibiæ spinose. Abdomen elongate-ovate, the first segment narrowed into a petiole at its base, with five yellow bands, the second and third generally interrupted, and the fourth and fifth usually entire, the first sometimes slightly interrupted, the second broadest; beneath immaculate, with the apex ferruginous.

Male. Length 4-5 lines.—Differs in having the flagellum sub-fusiform, its six basal joints concave beneath, the seventh and three following joints serrated on the exterior, and the first five fimbriated within; the anterior coxæ produced at their apex into a long acute tooth; their trochanters flat beneath; their femora dilated posteriorly, flat, and having at their base beneath a long curved spine; their tibiæ dilated posteriorly into a concavo-convex plate; the tarsi dilated, the first joint concave

above, the apical joint produced within into a compressed plate, the apex below obsoletely bidentate, within emarginate, and above having a long curved spine; the trochanters and femora yellow, the latter black in front; the tibiæ yellow in front, with a black stripe behind; their plate slate-coloured behind, where it has some abbreviated transverse pale striæ and maculæ, in front piceous; their tarsi testaceous; the intermediate coxæ and trochanters yellow; the femora yellow before and behind; the posterior legs as in the other sex.

This species is equally abundant with the foregoing, and is found in most sandy situations; it provisions its nest with Diptera, and, like the preceding species, burrows in the ground.

*** Antennæ of the males simple. Anterior tibiæ simple, their tarsi dilated.*

29. Crabro palmipes.

C. niger; tarsis anticis palmatis; metathoracis basi oblique striato. *Mas.*

Sphex palmipes, Linn. *Syst. Nat.* i. 944. 20 ♂.

Gmelin, ed. Syst. Nat. i.

Vill. Ent. iii. 231. 31.

Crabro palmipes, Van d. Lind. *Obs.* ii. 47. 8.

St. Farg. Ann. Soc. Ent. Fr. iii. 765. 2; *Hym.* iii. 169. 2.

Dahlb. Hym. Europ. i. 332. 217.

Wesm. Hym. Foss. Belg. 135. 14.

Crabro tarsatus, Shuck. *Foss. Hym.* 133. 6 ♂.

Crabro pusillus, Herr. Schöff. *Faun. Germ.* 181. 55. t. 23 & 24.

Male. Length $2\frac{1}{2}$ lines.—Black; head smooth and shining, with a few minute scattered punctures, a deep longitudinal impression extending from the base of the antennæ to the anterior sterna, behind which it passes a little beyond the posterior ones; the scape yellow outside, the flagellum fimbriated beneath; the inner orbit of the eyes, the cheeks, and the clypeus covered with silvery silky pubescence, the latter carinated in the middle. Thorax shining and punctured; the mesothorax with three abbreviated, slightly elevated, longitudinal lines at its base; the metathorax with a cruciform consute impression, dilating at the base of the metathorax into an impressed triangle, which is longitudinally striate, the enclosed subcordiform space convex on each side and obliquely striated; the truncated portion with the lateral margins raised and transversely striated; the wings hyaline, their extreme base yellowish, their apical margins

clouded; a minute tooth at the apex of the metasternum, a spot on the scutellum, and an interrupted line on the collar, yellow; the anterior legs yellow; the coxæ and trochanters black, a black line on the exterior of the femora and tibiæ, and the base of the tibiæ within, black; their tarsi whitish, the first joint dilated and rounded behind, the following subtriangular, all covered with a silvery pubescence; the basal joint with a black spot on its exterior margin, the claw-joint also black; the intermediate and posterior legs, with the knees and lower portion of the tibiæ, yellow; the tarsi of the intermediate pair whitish, with the apex of the first two joints, and the whole of the last, black; the first joint of the posterior tarsi whitish. Abdomen elongate, delicately punctured, with a slight griseous pubescence, the basal segment subpetiolate.

Female. Length 3 lines.—Resembling the male; the legs black; the anterior tibiæ in front, the base of the intermediate and posterior tibiæ, and the two basal joints of their tarsi, white; the yellow on the collar and scutellum seldom present as in the male.

The latter sex has not been taken in this country. The above is Van der Linden's description of it. The male is occasionally taken in the London district, but it is not common; it has occurred at Deal, at Shanklin, Isle of Wight, and at Bristol.

30. *Crabro clypeatus*.

C. niger; capite triquetro; abdomine flavo-maculato; antennis filiformibus. *Mas.*

C. niger; capite quadrato; abdomine flavo-fasciato, primis tribus interruptis. *Fæm.*

Spheg clypeata, Linn. *Syst. Nat.* i. 945. 24 ♂, & *Cab. Mus. Linn. Soc.*

Schrank, Ins. Austr. p. 386. 780.

Christ. Hym. p. 285. t. 27. f. 5.

Crabro clypeatus, *Fabr. Syst. Ent.* p. 375. 7 ♂; *Ent. Syst.* ii. 297. 15; *Syst. Piez.* p. 312. 18.

Rossi, Faun. Etrus. ii. 90. 880.

Latr. Hist. Nat. xiii. 323. 2; *Nouv. Dict.* 2nd ed. viii. 358.

Crabro vexillatus, *Panz. Faun. Germ.* 46. 5.

Illig. ed. Faun. Etrus. ii. 149.

Van d. Lind. Obs. ii. 45. 6 ♂ (nec ♀).

Shuck. Foss. Hym. p. 132. 5 ♂.

Dahlb. Hym. Eur. i. 375. 212 ♂ ♀.

Wesm. Hym. Foss. Belg. 147. 27.

Crabro lapidarius, *Fabr. Syst. Piez.* 309. 6.

Van d. Lind. Obs. ii. 55. 14.

Smith, Cat. Brit. Hym. p. 120.

Thyreopus clypeatus, *St. Farg. Ann. Soc. Ent. Fr.* iii. 758. 4 ♂.

Solenius lapidarius, *St. Farg. Ann. Soc. Ent. Fr.* iii. 721. 8 ♀ ;
Hym. iii. 117. 1.

Female. Length 4 lines.—Black, punctured ; head quadrate, as wide as the thorax, very closely punctured, subconfluent ; the clypeus covered with silvery pubescence ; the scape and basal joint of the flagellum yellow. Thorax coarsely punctured, the punctures confluent, running into lines on the scutellum ; a narrow line on each side of the anterior margin of the prothorax, the tibiæ, tarsi, and femora towards their apex, yellow, the apical joints of the tarsi fuscous ; wings subhyaline, the nervures testaceous, the tegulæ rufo-piceous. Abdomen closely punctured ; each segment with a broad yellow fascia, the first three interrupted.

Male. Length 4 lines.—Black ; head and thorax deeply and very closely punctured ; the head narrower than the thorax, and narrowed into a neck behind, depressed in the middle before the ocelli ; the scape and two or three of the basal joints of the flagellum yellow, the rest fulvous beneath ; the clypeus covered with silvery pubescence. Thorax elongated and narrowed in front ; the metathorax truncated and transversely rugose, and having a deep central longitudinal channel ; the wings fusco-hyaline, with the nervures and tegulæ testaceous ; the legs yellow, with a black line beneath the anterior and intermediate femora ; the posterior femora black, with a yellow line in front ; the tibiæ rufo-fuscous within, with a dark stripe in front ; the anterior tibiæ dilated behind ; the basal joint of the tarsi expanded into a subrotund concavo-convex plate, the two following joints slightly dilated. Abdomen punctured ; each segment with a yellow fascia, the first four more or less interrupted ; beneath, the second with a large subquadrate macula, which is widest behind, and produced at the lateral angles ; the third, and sometimes the fourth, with a yellow band.

I have carefully examined the typical specimen in the Linnean Cabinet, and can detect no difference between it and a specimen which I captured in 1848 at Weybridge. Shuckard says the Linnean insect differs from his *C. vexillatus*, but he does not state in what particulars ; I confess I could not detect any. In 1853 I captured the *C. lapidarius* very near the spot where I had formerly taken *C. clypeatus*. I have little doubt it is the female of the latter ;—the habit of the insects is the same.

Div. 5.—*Abdomen subsessile ; ocelli in a curve.*

* *Antennæ of the males with two or more joints emarginate beneath ; their tarsi simple.*

31. Crabro vagus.

C. niger, flavo-maculatus ; stematibus in lineam curvam positis ; metathorace punctato.

Sphex vaga, Linn. Faun. Suec. 414. no. 1664 ; Syst. Nat. i. 946. 36.

Vill. Ent. iii. 238. 14.

Schæff. Icon. Ins. Ratisb. t. 94. f. 4, 5, & t. 127. f. 6.

Crabro vagus, Fabr. Syst. Ent. 375. 8 ; Ent. Syst. ii. 298. 17 ; Syst. Piez. 313. 22.

Panz. Faun. Germ. 46. 10.

Rossi, Faun. Etrus. ii. 91. 881.

Oliv. Encycl. Méth. vi. 515. 18.

Schrank, Faun. Boic. ii. 338. 2188.

Latr. Hist. Nat. xiii. 324. 4.

Van d. Lind. Obs. ii. 57. 16.

Shuck. Foss. Hym. 145. 11.

Zett. Ins. Lapp. 442. 2.

Dahlb. Hym. Europ. i. 392. 268.

Wesm. Hym. Foss. Belg. 147. 28.

Solenius vagus, St. Farg. Ann. Soc. Ent. Fr. iii. 722. 9 ; Hym. iii. 147. 28.

Female. Length 5–5½ lines.—Black ; head and thorax very closely punctured and slightly pubescent ; the face deeply canaliculated ; the clypeus carinated in the centre, and densely covered with silvery pubescence ; the inner margin of the mandibles and the scape yellow, the latter with a black stripe at their base within. Thorax : an interrupted line on the collar and a transverse stripe on the post-scutellum yellow, one or both of these sometimes obsolete ; the metathorax longitudinally striated at the base and transversely so beyond ; wings fusco-hyaline, with their apex darkest, the nervures and tegulae rufo-piceous ; the anterior tibiae yellow above and ferruginous in front, the intermediate pair yellow in front and above, and the posterior pair entirely yellow ; the extreme apex of all the tibiae ferruginous ; the tarsi piceous, the anterior pair slightly ciliated, the basal joint of the posterior pair frequently yellow. Abdomen : a yellow fascia at the base of the second, fourth and fifth segments, sometimes all entire, but the first and second frequently interrupted, the third rarely so ; a transverse yellow spot on each side of the third segment, and rarely an oblique spot on each side of the basal one.

Male. Length 4 lines.—Black; the antennæ 12-jointed, the fifth and sixth joints emarginate beneath; the metathorax as in the female; the anterior femora ferruginous above and in front, and yellow beneath, their tibiæ ferruginous in front and yellow above; the tarsi piceous, the first joint and base of the second pale, the first reddish at the base; the intermediate tibiæ yellow above and ferruginous in front; the posterior tibiæ yellow, with a black stain in front and a ferruginous one behind; the intermediate and posterior tarsi rufo-ferruginous, their basal joint more or less yellow; abdomen as in the female, with the addition of a narrow fascia, or two or three spots on the sixth segment.

Probably the most abundant and generally distributed species in Europe. I have bred this species from pieces of decaying Willow. It burrows in decaying trees of all kinds, and provisions its nest with Diptera.

32. *Crabro chrysostomus.*

C. niger, flavo-maculatus; clypeo aurato (♂ argentato); metathorace rugoso.

Mas.—Antennarum articulo tertio ad sextum subtus emarginatis.

Crabro fossorius, Van d. Lind. Obs. ii. 51. 10 ♂ (nec Linn.).

Crabro chrysostomus, St. Farg. Ann. Soc. Ent. Fr. iii. 704. 7 ♀; Hym. iii. 107. 7.

Herr. Schöff. Faun. Germ. 181. 22. t. 13 ♂.

Crabro xylurgus, Shuck. Foss. Hym. 139. 9.

Crabro lapidarius, Dahlb. Hym. Europ. i. 405. 272.

Wesm. Hym. Foss. Belg. 151. 32.

Female. Length 5–5½ lines.—Black; head and thorax closely and finely punctured, the head large and subquadrate; a delicately impressed line runs from near the hinder margin of the vertex to the deep concavity on the front; the clypeus carinated in the centre, slightly emarginate in front, and, as well as the inner orbits of the eyes, densely covered with golden pubescence; a thin pale golden pubescence on the cheeks; a line on the mandibles and the scape yellow. Thorax: the hinder portion of the mesothorax and the scutellum longitudinally rugose; the metathorax with a deep longitudinal central incisure, the base irregularly obliquely striated, the posterior portion transversely so; an interrupted line on the collar, and sometimes a spot on the tubercles, yellow; the tibiæ yellow, the anterior and intermediate pairs black beneath; a fuscous line on the anterior and posterior pairs within; the extreme apex of the tibiæ black;

the tarsi with the basal, sometimes the two basal joints, yellow, the rest fuscous; the anterior tarsi slightly ciliated, all the tibiæ spinose. Abdomen ovate, with five yellow bands more or less interrupted, the second sometimes entire, the third formed of two transverse ovate spots; the apical segment forming a grooved obtuse spine, the sides covered with golden setæ.

Male. Length $3\frac{1}{4}$ –4 lines.—Black; the scape yellow beneath; the second to the fifth joints of the flagellum beneath emarginate, produced into a tooth at their apex, the first and second teeth longest; the clypeus, inner orbits of the eyes, and the cheeks, covered with silvery pubescence. Thorax: the metathorax more strongly sculptured than in the female; the yellow lines on the collar frequently obsolete; the anterior tibiæ and femora reddish yellow in front, with a black line behind; the intermediate femora with a narrow yellow line in front at their apex, the tibiæ yellow, with a black line behind; the posterior femora with a yellow spot at their apex above, the tibiæ yellow, with a black line inside; the four anterior tarsi yellow, with the extreme base black; the basal joint of the intermediate tarsi produced beneath near its apex, and spinose. Abdomen: the second yellow band sometimes entire, the three following widely interrupted, the fifth sometimes entire, the sixth always so.

Wesmæel, who had the opportunity of examining Van der Linden's insects, decides that this is the *fossorius* of that author; and the female is, I think, certainly the *chrysostomus* of St. Fargeau.

This species burrows in decaying wood, particularly the trunks of old Willows. It provisions its cells with Diptera. I have several times reared the sexes from pieces of willow stumps. It is generally distributed.

** *Antennæ of the males simple; their tarsi also simple.*

33. *Crabro Lindenius.*

C. niger, flavo-maculatus, stemmatibus in lineam curvam positis; metathoracis basi longitudinaliter striato.

Crabro Lindenius, Shuck. Foss. Hym. 143. 10.

Crabro interruptus, Dahlb. Hym. Eur. i. 418. 275?

Crabro striatus, Dahlb. Hym. Eur. i. 321. 35.

Wesm. Hym. Foss. Belg. 156. 35.

Female. Length 6–7 lines.—Black; head large, subquadrate, pubescent, and rather wider than the thorax; a slightly im-

pressed line runs backwards from the anterior ocellus beyond the posterior pair; it also extends forwards, less slightly impressed, to the deep canaliculation of the face; the inner orbit of the eyes and the clypeus densely covered with silvery pubescence; the clypeus carinated in the centre; the scape and mandibles yellow, the latter rufo-piceous at their apex. Thorax: the mesothorax transversely striated before the tegulæ, the hinder portion longitudinally so; the scutellum, and a semi-circular enclosed space at the base of the metathorax, longitudinally striated, the posterior portion of the latter transversely striated; an interrupted line on the collar, the tubercles, a transverse stripe at the base of the scutellum with a united minute dot at each end, yellow; the tibiæ, tarsi, and sometimes the tips of the femora, yellow; the anterior tibiæ beneath and a spot beneath the intermediate pair black; the apical joints of the tarsi rufo-piceous, the anterior pair slightly ciliated outside, and the intermediate and posterior tibiæ spinose. Abdomen: each segment with a broad yellow fascia, frequently entire, sometimes the third and fourth more or less interrupted; the sides of the apical segment yellow, deeply canaliculated above, with the margins of the channel fringed with rigid yellow setæ.

Male. Length 5-5½ lines.—Antennæ 12-jointed, the scape yellow in front; the mandibles with sometimes a yellow line on their inner margin; the clypeus with silvery pubescence; the collar with a yellow spot on each side, sometimes obsolete; the thorax striated as in the female; the legs yellow, with the anterior femora behind, the intermediate pair behind and beneath, and the posterior pair black, the tibiæ usually with a dark stain behind; the apex of the basal joint of the intermediate tarsi produced beneath; the abdomen fasciated as in the female, but with an additional band, the fasciæ are usually more interrupted; the apical segment with a longitudinal groove.

This conspicuous and very distinct species is not frequently taken; it must be very local: I have only found it at Darenth Wood, in July, and once at Southgate; it also occurs at Ripley in Surrey, and near Bristol.

34. *Crabro albilabris*.

C. niger; capite thoracis latitudine; metathoracis basi longitudinaliter striato; abdomine ovato-conico, nigro-viridi.

Mas.—Tibiis tarsisque flavis.

Crabro albilabris, *Fabr. Ent. Syst.* ii. 302. 31 ♀.

Van d. Lind. Obs. ii. 55. 28 ♂ ♀.

Shuck. Foss. Hym. 171. 30.

Zett. Ins. Lapp. 444. 9.

Crabro leucostoma, *Panz. Faun. Germ.* 15. 24; *Krit. Revis.* ii. 185.

Pemphredon albilabris, *Fabr. Syst. Piez.* 316. 8.

Lindénius albilabris, *St. Farg. Hym.* iii. 197. 4.

Dahlb. Hym. Europ. i. 300. 182.

Wesm. Hym. Foss. Belg. 124. 1.

Crabro canescens, *Dahlb. Exam. Crabr. Scand.* 23. 2. t. 1 ♀.

Female. Length 3–3½ lines.—Black, with an æneous tinge; the head quadrate; a line in front of the anterior ocellus extending to the sulcation of the face, another behind it which runs to the posterior margin of the face; the scape and mandibles yellow, the latter ferruginous at their apex; the inner orbits of the eyes and the clypeus covered with silvery pubescence. Thorax finely punctured and pubescent; the metathorax with an enclosed subcordiform space at its base longitudinally striated, beyond which the striation is transverse; the wings slightly coloured, the nervures and tegulæ piceous, the extreme base of the wings yellowish; the anterior tibiæ in front, and the intermediate and posterior pairs at their base, yellow; the tarsi piceous, their basal joint darkest; the anterior tarsi ciliated in front, and the intermediate and posterior tibiæ spinose. Abdomen covered with fine downy pubescence, the apical segment punctured, its apex rufescent.

Male. Length 3 lines.—Closely resembles the female; but has the apex of the scape, an interrupted line on the collar, the tubercles, tips of the femora, the tibiæ and tarsi, yellow; the tibiæ with a black stripe behind and the apical joints of the posterior tarsi piceous; the apex of the intermediate tibiæ within and also the basal joint of the tarsi with a fringe of long curled white hair.

This is not a scarce species, and is widely distributed. It is plentiful about London; and I have taken both sexes in Yorkshire during July.

35. *Crabro Panzeri.*

C. niger; capite magno, metathoracis basi longitudinaliter striato, apice transverso striato; abdomine ovato-conico, margine infero capitis utrinque spina striato.

Crabro Panzeri, *Van d. Lind. Obs.* ii. 67. 29 ♂ ♀.

Shuck. Foss. Hym. 173. 31.

Lindenius Panzeri, *St. Farg. Hym.* iii. 201. 8.

Dahlb. Hym. Europ. i. 302. 183.

Wesm. Hym. Foss. Belg. 124. 1.

Female. Length 3-3½ lines.—Shining black; head and thorax closely and finely punctured; the head large, quadrate, wider than the thorax; the scape of the antennæ and the mandibles yellow, the latter ferruginous at their apex; the clypeus, inner orbit of the eyes, and lower portion of the cheeks covered with silvery pubescence. Thorax: an interrupted line on the collar, the tubercles, and a spot on the scutellum, yellow; the tips of the femora, the tibiæ, and tarsi yellow; the anterior and intermediate tibiæ black beneath, the posterior tibiæ black at their apex; the apical joints of the tarsi fusco-ferruginous; the anterior tarsi ciliated, and the intermediate and posterior tibiæ spinose; the subcordiform space at the base of the metathorax obliquely striated, the truncation obliquely so. Abdomen slightly æneous, the lateral portion of the four basal segments and the fifth segment entirely covered with grey pubescence; the apical segment strongly punctured, its apex ferruginous.

Male. Length 3 lines.—Very like the female, but with the head proportionably larger, and the cheeks with a stout acute spine; the scape with sometimes a yellow stripe laterally; the scutellum in rare instances has a yellow dot; the legs with less yellow than in the female.

Not an abundant species, but found occasionally in the London district. I have taken it also at Darent, Birch Wood, Weybridge, and the Isle of Wight.

36. *Crabro brevis.*

C. niger; capite subquadrato, thoracis latitudine; metathoracis basi lævi; abdomine ovato, basi subtruncato.

Crabro brevis, *Van d. Lind. Obs.* ii. 70. 32 ♂ ♀.

Shuck. Foss. Hym. 169. 28.

Lindenius brevis, *St. Farg. Hym.* iii. 202. 10.

Entomognathus brevis, *Dahlb. Hym. Europ.* i. 295. 179.

Wesm. Hym. Foss. Belg. 124. 1.

Female. Length 2½ lines.—Black and shining; the head and thorax finely punctured; an oblique smooth depression on each side of the posterior ocelli, which have a longitudinal impression between them; the scape yellow at the sides, and fulvous at the base; the clypeus convex, and, as well as the inner orbits of the eyes, covered with silvery pubescence, the lower portion

of the cheeks also with silvery pubescence; the mandibles ferruginous at their apex, and with an obtuse tooth at their base. Thorax: the tubercles, tegulæ in front, the tibiæ and tarsi yellow; the extreme apex of the femora yellow; the anterior and intermediate tibiæ with a longitudinal stain beneath, the posterior pair black except at their base; the intermediate and posterior tarsi rufo-fuscous, the anterior pair slightly ferruginous; the enclosed space at the base of the metathorax smooth and shining; the posterior portion only slightly punctured, the lateral margins rounded. Abdomen short, ovato-conical, covered with griseous pubescence; the apical margins of the segments narrowly picuous, the apical segment ferruginous and coarsely punctured.

Male. Length 2-2½ lines.—Black; the mandibles at their base, and the scape, yellow; the latter sometimes with a dark stain behind; the legs more yellow than in the other sex.

This species is not uncommon. I have taken it entering its burrows in a hard sand-bank; it had formed quite a small colony; the females were conveying species of *Halticæ* into their burrows.

Genus 3. OXYBELUS.

Vespa, pt., *Linn. Syst. Nat.* i. 948 (1766).
 Apis et Nomada, pt., *Fabr. Mant.* i. (1787).
 Crabro, pt., *Fabr. Ent. Syst.* ii. 293 (1793).
 Oxybelus, *Latr. Hist. Nat.* xiii. (1805).

Head transverse, as wide as the thorax; eyes lateral and ovate; ocelli in an obtuse angle on the vertex; antennæ short, arcuate and filiform, inserted at the base of the clypeus; the clypeus transverse. Thorax rotundate; the collar transverse; the scutellum transverse, lunulate and having on each side of its posterior margin an incurved squama; the metathorax truncated, with a curved spine in the middle of its base; the anterior wings with one marginal cell slightly appendiculated at its apex, and one complete submarginal cell separated from the second discoidal cell by a faintly-traced nervure and receiving the recurrent nervure at one-third distance from its apex; the legs stout, the anterior tarsi ciliated, the intermediate and posterior tibiæ spinose, the claws bifid with a large pulvillus between their fork. Abdomen ovato-conic, subtruncate at the base.

The insects belonging to this genus prey upon Diptera. Their mode of capturing their prey is singular. I once observed several females running amongst the blades of grass which shot up from the surface of a little hillock upon which the sun shone and tempted various Diptera occasionally to alight. The *Oxybeli* continued to run about apparently unheeding of the flies, until at length the latter became somewhat accustomed to their presence; but when the *Oxybelus* came within five or six inches, it darted upon the luckless fly in the same manner as a cat springs upon its prey.

1. *Oxybelus uniglumis*.

O. niger; abdominis segmentis punctis albis sublateralibus; tibiis tarsisque rufis.

Vespa uniglumis, Linn. *Faun. Suec.* 418. no. 1681; *Syst. Nat.* i. 951. 18.

Villers, Ent. iii. 271. 14.

Christ. Hym. 246.

Crabro uniglumis, *Fabr. Syst. Ent.* 376. 12; *Ent. Syst.* ii. 300. 23.

Rossi, Faun. Etrus. ii. 92. 884.

Oliv. Enc. Méth. vi. 518. 34.

Panz. Faun. Germ. 64. 14.

Oxybelus uniglumis, *Latr. Hist. Nat.* xiii. 307. 2.

Fabr. Syst. Piez. 316. 2.

Oliv. Enc. Méth. viii. 595. 8.

Van d. Lind. Obs. ii. 35. 5.

Shuck. Foss. Hym. 107. 1.

Zett. Ins. Lapp. 446. 1.

Dahlb. Hym. Europ. i. 273. 172.

Guér. Icon. Règ. Anim. Ins. t. 71. f. 2.

St. Farg. Hym. iii. 221. 13.

Wesm. Hym. Foss. Belg. 157. 1.

Female. Length 3-4 lines.—Black; the head closely punctured and pubescent; the face thinly covered with silvery pubescence; the mandibles ferruginous at their apex; the flagellum beneath, and usually some of the terminal joints, fulvous. Thorax punctured and slightly pubescent; the mesothorax with a central and two short lateral impressed lines; the scutellum and post-scutellum with a central longitudinal carina; the squama on each side of the posterior margin of the scutellum, white and subhyaline; the mucro at the base of the metathorax grooved above and slightly curved downwards, the metathorax reticulated; the tubercles and a spot on the tegulæ in front white; the wings subhyaline and iridescent, the nervures pale rufotestaceous; the tibiæ and tarsi ferruginous, with the base of the

former usually yellowish-white; the anterior tarsi ciliated, and the intermediate and posterior tibiæ spinose. Abdomen shining and delicately punctured, the margins of the segments slightly constricted; a large ovate macula on each side of the basal segment, the second, third and fourth with a transverse line on each side, the latter sometimes united, yellowish-white, the fifth segment with a continuous band; the markings frequently more or less obliterated, those on the three basal segments usually present.

Male.—Usually rather smaller, the face more silvery, the legs with more yellow at the base of the tibiæ, the latter being frequently dashed with yellow outside, the posterior pair having usually a large black splash outside; the abdomen with only the two basal segments maculated with white, in very rare instances entirely black.

A most abundant insect, occurring in most sandy situations; very highly-coloured examples are sometimes found at Deal, Dover, and Lowestoft, where it is extremely numerous.

2. *Oxybelus mucronatus*.

O. niger, argenteo-sericeus; thorace abdomineque flavo-maculatis; pedibus testaceis; mucrone metathoracis acuto.

Crabro mucronatus, *Fabr. Ent. Syst.* ii. 300. 25 ♀.

Oxybelus mucronatus, *Fabr. Syst. Piez.* 318. 5.

Latr. Gen. Crust. et Ins. iv. 79.

Dahlb. Hym. Eur. i. 266. 162.

Wesm. Hym. Foss. Belg. 157. 2.

Oxybelus ferox, *Shuck. Foss. Hym.* 108. 2 ♂.

Oxybelus argentatus, *Curtis, Brit. Ent.* x. 480 ♀

Shuck. Foss. Hym. 111. 5.

Female. Length 4 lines.—Black, covered with dense glittering silvery pubescence; the apex of the scape, and one or two of the apical joints of the flagellum, fulvous. Thorax: the tubercles and tegulæ in front yellowish-white; a transverse yellow plate, dentate at its lateral posterior angles, at the apex of the scutellum; the mucro at the base of the metathorax grooved above and acute at its apex; the metathorax reticulated; the wings hyaline and iridescent, the nervures pale rufo-testaceous; the legs pale rufo-testaceous, with the anterior femora, the intermediate and posterior pairs at their base, and the trochanters and coxæ dark reddish-brown, sometimes nearly black; the anterior tibiæ in front, their femora at their apex,

and the intermediate and posterior tibiæ at their base, yellow. Abdomen: an oblong yellow macula on each side of the three basal segments, and a transverse continuous band on the fourth and fifth; sometimes the spots on the third segment united.

Male. Length 3 lines.—Resembles the female closely, but with much less of the silvery pubescence on the body; the face densely covered with silvery pubescence; the mesothorax with a central longitudinal carina, which also crosses the scutellum and post-scutellum; the metathoracic spine grooved above, curved slightly downwards, and acute at the apex; the squama at the apex of the scutellum yellow at the sides; the legs yellow, with the coxæ, trochanters, base of the anterior and intermediate femora, and the posterior pair exteriorly, except their extreme apex, nigro-piceous; the apex of the tibiæ and the tarsi pale ferruginous. Abdomen: a lateral yellow spot on all the segments, each decreasing in size to the apical one.

This is a very local species, but has been taken in some abundance near Bristol and Liverpool. I have taken it sparingly at Deal, on the sand-hills. Shuckard's *A. ferox* is the male; the female is certainly the *O. mucronatus*, as certified by Professor Béhn, on comparison with the typical specimen in the museum at Kiel, and communicated to M. Dahlbom.

3. *Oxybelus nigripes*.

O. niger, squamisque etiam nigris; mucrone obtuso incurvo; abdominis segmento primo et secundo punctis duobus flavis.

Oxybelus trispinosus, *Fabr. Syst. Piez.* 318. 7?

Oxybelus nigripes, *Oliv. Encycl. Méth.* viii. 596. 12 ♀.

Shuck. Foss. Hym. 109. 3.

St. Farg. Hym. iii. 217. 7.

Female. Length 3½ lines.—Black, closely punctured; the face densely covered with silvery pubescence; the apical joints of the antennæ fulvous; the mandibles rufo-testaceous, with their apex black. Thorax: the scutellum with a central longitudinal carina; the post-scutellum has on each side a pale squama; the metathoracic spine curved, canaliculated, with the apex emarginate; the wings hyaline and iridescent; the nervures fuscous, becoming rufo-testaceous at the base of the wings; the tegulæ rufo-testaceous; the legs black, with the tips of the anterior femora, their tibiæ and tarsi, rufo-ferruginous; the intermediate and posterior tarsi of the same colour; all the tibiæ yellowish at their base; the anterior tarsi ciliated, and the

intermediate and posterior tibiæ strongly spinose. . . Abdomen slightly pubescent, the basal segment with a transverse ovate spot on each side, the second segment with a narrow line, yellow.

A single specimen of this species was taken in Devonshire by Mr. S. Stevens; the typical one in the British Museum was probably taken in the same locality. The four following species were also very probably taken in Devonshire by Dr. Leach, but there is no record of their capture.

4. *Oxybelus bellicosus*.

O. niger, flavo-maculatus; mucrone canaliculato, ad apicem dilatato et emarginato.

Oxybelus bellicosus, *Oliv. Encycl. Méth.* viii. 595. 9.

Shuck. Foss. Hym. 110. 4.

Van d. Lind. Obs. ii. 36. 7.

Dahlb. Hym. Europ. i. 269. 167.

St. Farg. Hym. iii. 217. 8.

Lucas, Explo. Sc. d'Algér. iii. 262.

Female. Length $4\frac{1}{2}$ lines.—Black, and closely punctured, the abdomen delicately so; the apical margins of the joints of the antennæ rufo-piceous; the mandibles pale yellow, with their tips ferruginous. Thorax: the scutellum semicircular, with the margins slightly reflexed, and having a central longitudinal carina; the metathoracic spine curved, grooved above; the apex dilated and slightly emarginate; the collar tubercles and the bifid squama at the posterior margin of the scutellum yellow; the wings subhyaline and iridescent, the nervures piceous, the tegulæ rufo-testaceous; the legs rufo-testaceous, with the coxæ and trochanters black, variegated with yellow; the anterior femora within, and the intermediate and posterior pair with an internal line, yellow; the base of all the tibiæ yellow. Abdomen slightly pubescent; the basal segment with a transverse ovate spot on each side, and the three following with a transverse narrow line, yellow.

Shuckard has described the typical specimen in the British Museum as a male; it is certainly a female. The habitat of this insect is not known.

5. *Oxybelus 14-notatus*.

O. niger, flavo guttatus; mucrone metathoracis brevi obtuso et emarginato.

Oxybelus quatuordecim-notatus, *Jurine, Hym.* 217. t. 11. f. 5.

Latr. Gen. Cr. et Ins. iv. 79.

Oliv. Encycl. Méth. viii. 596. 13.

Van d. Lind. Obs. ii. 37. 11.

St. Farg. Hym. iii. 220. 12.

Oxybelus quatuordecim-guttatus, *Shuck. Foss. Hym.* 112. 9.

Dahlb. Hym. Europ. i. 270. 168.

Female. Length $3\frac{1}{2}$ lines.—Black; head and thorax punctured and pubescent; antennæ piceous, with the apex of the scape and the apical half of the flagellum fulvous; mandibles yellow at their base, rufous in the middle, and black at their apex. Thorax: a transverse line on each side of the collar, the tubercles, tegulæ, a spot on each side of the scutellum, two curved lines running from the lateral edges of the scutellum to the base of the wings, and two incurved squamæ at the posterior margin of the scutellum, yellow; the spine at the base of the metathorax short, obtuse, and emarginate at its apex; wings slightly coloured, with their nervures brown; legs black, with the inside of the anterior and intermediate femora, and the exterior of all the tibiæ, yellow; the tarsi ferruginous, the basal joints of the intermediate and posterior pairs fusco-ferruginous. Abdomen delicately punctured, with a transverse yellow spot on each side of the first five segments; the margins of the third, fourth, and fifth segments rufo-piceous, and the apical segment ferruginous.

Hab. Not known. Type in the British Museum.

6. *Oxybelus nigricornis*.

O. niger; thorace abdomineque flavo maculatis; pedibus flavis; mucrone metathoracis acuto.

Oxybelus nigricornis, *Shuck. Foss. Hym.* 112. 7.

Dahlb. Hym. Eur. i. 267. 164.

Female. Length $3\frac{1}{2}$ lines.—Head and thorax black, punctured, and pubescent; the face covered with silvery pubescence. Thorax: a spot on each side of the collar, the tubercles, and the squamæ at the posterior margin of the scutellum, yellow; the mucro at the base of the metathorax canalculated above, and acute at the apex; the wings slightly coloured, their nervures rufo-testaceous; the legs yellow, with the inside of the anterior femora and the upper part of the intermediate and posterior tibiæ black; the tarsi ferruginous, the anterior pair ciliated, and the intermediate and posterior tibiæ spinose.

Abdomen delicately punctured, the first segment with a large ovate spot on each side, and a transverse line on each side of the three following, yellow.

The *Male* has the face more silvery, the inside of the anterior tibiae at their apex ferruginous, and the inside of the intermediate and posterior pair with a piceous spot at their apex, nearly forming a ring. Abdomen: the margins of the segments constricted, and from the second less marked with yellow.

Hab. Not known. Type in the British Museum.

7. *Oxybelus bipunctatus*.

O. niger, flavo pictus; mucrone metathoracis acuto; abdomine nitente æneo irradiante.

Oxybelus bipunctatus, *Oliv. Encycl. Méth.* viii. 597. 16.

Van d. Lind. Obs. ii. 38. 14?

St. Farg. Hym. iii. 220. 11.

Wesm. Hym. Foss. Belg. 160. 5.

Oxybelus nigro-æneus, *Shuck. Foss. Hym.* 113. 8.

Dahlb. Hym. Europ. i. 272. 170?

Male. Length 2-2½ lines.—Black; the head and thorax deeply punctured; the face covered with silvery pubescence; antennæ from the fifth joint fulvous beneath; the mandibles testaceous, with their apex ferruginous. Thorax: the margin of the squamæ and the apex of the scutellum pale; the mucro at the base of the metathorax short, thick, and slightly curved; the wings hyaline and iridescent, their nervures brown, the tegulæ piceous; the outside of the anterior and intermediate tibiae, the posterior pair within, and the basal half exteriorly, yellow; the anterior tarsi testaceous, and the intermediate and posterior pairs rufo-piceous. Abdomen delicately punctured, shining, with an æneous reflexion; a bright-yellow transverse ovate spot on each side of the two basal segments, and a minute spot on each side of the third.

Locality not known. Type in British Museum.

Genus 4. *SPILOMENA*.

Stigmus, pt., *Van d. Lind. Obs.* ii. 74 (1829).

Celia, *Shuck. Foss. Hym.* 182 (nec *Zimm. Col.*) (1837).

Spilomena, *Shuck. Trans. Ent. Soc.* ii. 79 (1840).

Head transverse, as wide as the thorax; the ocelli in an equilateral triangle on the vertex; the eyes ovate; antennæ in-

serted on each side of the base of the clypeus; labrum concealed; mandibles simple and arcuate (in the males, bidentate at the apex). Thorax ovate; the collar transverse; the scutellum transverse; the metathorax elongate and truncated; *the anterior wings with the stigma large and ovate, with one marginal and two submarginal cells, the first submarginal cell nearly twice as large as the second, which is quadrate; the recurrent nervure unites with the first transverso-cubital nervure; legs simple.* Abdomen subsessile, ovate-conic.

1. *Spilomena troglodytes*.

S. niger; pedibus piceis, tarsis posticis ferrugineis.

Stigma troglodytes, *Van d. Lind. Obs.* ii. 74. 2.

St. Farg. Hym. iii. 99. 2.

Celia troglodytes, *Shuck. Foss. Hym.* 182. 1.

Dahlb. Hym. Europ. i. 238. 139.

Spilomena troglodytes, *Wesm. Hym. Foss. Belg.* 123. 1.

Female. Length $1\frac{3}{4}$ line.—Black and shining; the scape and basal joint of the flagellum pale ferruginous; these are sometimes black; a carina runs up the middle of the face from the base of the clypeus, halfway to the vertex, where it becomes an impressed line, which extends to the anterior ocellus. Thorax very delicately punctured; the collar longitudinally striated; the scutellum quadrate; the superior surface of the metathorax enclosed by a ridge round its margins; the enclosure with two abbreviated longitudinal carinae in the centre, the space between them transversely striated; the wings hyaline and iridescent, the stigma very large and black; the anterior tibiae, the apex of the intermediate pair, and all the tarsi, ferruginous. Abdomen smooth and shining.

Male. Length $1\frac{3}{4}$ line.—Differs from the female in having the clypeus very much produced; the clypeus, a spot on each side, the mandibles, scape, and basal joint of the flagellum, yellow; the legs usually pale rufo-testaceous, with the posterior femora fuscous.

* This insect is only occasionally captured, usually by sweeping herbage; it is found about London, and appears to be pretty generally distributed. I once took several specimens entering burrows in a bank of very fine hard white sand, at Charlton, Kent.

Genus 5. STIGMUS.

Stigma, *Jurine, Hym.* 139 (1840).

Head subquadrate, a little wider than the thorax; eyes ovate; ocelli in a triangle; antennæ inserted at the base of the clypeus; the labrum concealed; mandibles dentate. Thorax ovate; the metathorax truncated and elongate; *the anterior wings with the stigma very large, with one marginal and two submarginal cells; the marginal cell acute at the apex; the first submarginal twice the size of the second, and receiving the recurrent nervure beyond the middle; the second submarginal nearly square;* the legs simple. Abdomen petiolated, the petiole rather longer than the first segment, and narrowest at its base; the abdomen oblong, and pointed at its apex.

1. *Stigma pendulus*.

S. niger; mandibulis testaceis; pedibus anterioribus et tarsis posticis ferrugineis.

Stigma pendulus, Panz. Faun. Germ. 86. 7.

Van d. Lind. Obs. ii. 74. 1.

Shuck. Foss. Hym. 181. 1.

Dahlb. Hym. Europ. i. 1.

St. Farg. Hym. iii. 98. 1.

Wesm. Hym. Foss. Belg. 122. 1.

Stigma ater, Jurine, Hym. 132. t. 9. gen. 7.

Spin. Ann. Soc. Ent. Fr. (1840) p. 35.

Female. Length 3 lines.—Black and shining; the head with an impressed line running from the anterior ocellus to the insertion of the antennæ; the antennæ ferruginous, slightly stained above, the middle of the scape dusky; the mandibles reddish yellow. Thorax: the collar longitudinally striated; the metathorax rugose, with a central longitudinal carina above, and also a slightly curved one on each side; the tubercles white behind; the wings hyaline, and beautifully iridescent; the tegulæ rufo-testaceous; the anterior and intermediate tibiæ, all the tarsi, the posterior tibiæ at their base, and the tips of the femora, pale ferruginous. Abdomen petiolated, the petiole longer than the first segment, with a longitudinal carina on each side, and the interstices roughened; the apex acute.

Male. Length $1\frac{1}{2}$ line.—The male only differs in having the face silvery, and the antennæ and mandibles paler; in other respects there is scarcely any difference.

Found in the London district; may be sometimes taken settling on leaves of plants during hot sunny days in July and August; not very abundant.

Genus 6. DIODONTUS.

Crabro, pt., *Fabr. Ent. Syst.* ii. 293 (1793).

Pemphredon, pt., *Fabr. Syst. Piez.* p. 314 (1804).

Stigmus, *Latr. Gen. Crust. et Ins.* iv. 84 (1806).

Cemonus, *Jurine, Hym.* p. 214 (1807).

Diodontus, *Curtis, Brit. Ent.* ii. 496 (1836).

Head subquadrate, wider than the thorax; eyes lateral and ovate; ocelli in a triangle; antennæ inserted at the base of the clypeus, not approximated; the clypeus transverse and tridentate; the labrum produced and deeply emarginate; the mandibles bidentate. Thorax ovate; the metathorax obtusely rounded; the anterior wings with one marginal cell, acute at its apex, and two submarginal cells; the first oblong, receiving the first recurrent nervure beyond the middle; the second much narrowed towards the marginal cell, receiving the second recurrent nervure. Abdomen ovato-conical, attached to the thorax by a very short petiole, the apex acute, in the male constricted into an acute upcurved spine.

The species of this genus may all be obtained in plenty by collecting perforated rose-branches, or those of the common Bramble; they provision their nests with Aphides; they also burrow in sand-banks.

1. *Diodontus minutus*.

D. ater; mandibulis nigris, basi et apice nigris; tibiis anticis et intermediis pallide ferrugineis.

Crabro minutus, *Fabr. Ent. Syst.* ii. 302. 32.

Pemphredon minutus, *Fabr. Syst. Piez.* 316. 9.

Van d. Lind. Obs. ii. 78. 2.

St. Farg. Hym. iii. 96. 2 ♀ (non ♂).

Sphex pallipes, *Panz. Faun. Germ.* 52. 22?

Cemonus minutus, *Jurine, Hym.* 214.

Stigmus minutus, *Latr. Gen. Crust. et Ins.* iv. 84.

Diodontus minutus, *Curtis, Brit. Ent.* fol. 496.

Shuck. Foss. Hym. 185. 1.

Dahlb. Hym. Europ. i. 252. 152.

Wesm. Hym. Foss. Belg. 121. 2.

Female. Length 2 lines.—Black and shining; the head deli-

entely punctured; the clypeus tridentate; the mandibles yellow, their apex ferruginous. Thorax delicately punctured on the disk; the metathorax rugose, the base rugose-striate; the tubercles and tegulae in front yellowish white, the latter rufo-testaceous behind; the wings hyaline and splendidly iridescent, the nervures rufo-testaceous; the anterior and intermediate tibiae, and the posterior at the base and apex, the tips of the femora and the tarsi, fulvous; the anterior tibiae sometimes yellowish and with a fuscous stain outside, sometimes the posterior tarsi fuscous. Abdomen with a slight griseous pile.

Male.—Rather smaller than the female, and with the face covered with silvery pubescence; the flagellum yellow beneath, with the tips of the joints fuscous; the basal joint of the anterior tarsi curved; the legs paler than in the other sex; the basal joint of the intermediate tarsi dilated at its apex behind.

Some of the males of this abundant species have the head very large, sometimes twice as wide as the thorax. Taken in great numbers entering its burrows in a bank which it was provisioning with a species of *Aphis*.

2. *Diodontus luperus*.

D. ater; incisura inter mesothoracem et scutellum simplice.

Diodontus luperus, Shuck. Foss. Hym. 186. 2.

Dahlb. Hym. Europ. i. 254. 153.

Female. Length $2\frac{1}{2}$ lines.—Black and shining; the head finely punctured, the face most closely and strongly so; mandibles entirely black, or sometimes slightly ferruginous at their apex. Thorax: the disk with a few scattered fine punctures; the incisure which separates the scutellum from the mesothorax simple, not crenate or punctured; the metathorax rugose, rugose-striate at the base; the wings hyaline and splendidly iridescent; the anterior tibiae yellowish in front, the basal joints of all the tarsi more or less rufous, the intermediate and posterior tibiae spinose, the anterior tarsi ciliated. Abdomen very slightly pubescent, the apical margins of the two or three terminal segments sometimes rufo-piceous.

Male rather smaller than the female, with face silvery; the anterior tibiae and tarsi, and the base of the posterior tibiae, yellow; the anterior tibiae have sometimes a dark stain behind.

Equally abundant as the preceding species, and readily distinguished by the colour of the mandibles, and the simple incisure at the base of the scutellum.

3. *Diodontus tristis*.

D. ater ; incisura inter mesothoracem et scutellum consuta ; antennæ pedibusque atris.

Pemphredon tristis, *Van d. Lind. Obs.* ii. 76. 1.

Diodontus tristis, *Shuck. Foss. Hym.* 187. 3.

Dahlb. Hym. Europ. 249. 149.

Wesm. Hym. Foss. Belg. 120. 1.

Diodontus pallipes, *Dahlb. Hym. Europ.* i. 250. 151 ♂.

Female. Length $3\frac{1}{2}$ lines.—Black and shining ; head large, subquadrate, wider than the thorax, finely punctured, most closely so on the face ; the mandibles obscurely ferruginous at the apex. Thorax : the disk finely punctured ; the deep channel which separates the scutellum from the mesothorax with a number of transverse elevations (consute) ; the metathorax very coarsely rugose ; the wings hyaline and splendidly iridescent ; the nervures piceous, the stigma blackish ; the tarsi sometimes obscurely rufo-testaceous ; the calcaria testaceous, the intermediate and posterior tibiæ spinose. Abdomen ovato-conic, and very delicately punctured, the apex obscurely testaceous.

Male. Length $2\frac{1}{2}$ lines.—Differs in being more strongly punctured on the head and thorax ; the face silvery ; the anterior tibiæ in front, the posterior pair at their base, the anterior tarsi and basal joint of the intermediate and posterior pairs, yellow, the latter obscure.

An abundant species in the London district, and generally distributed ; it preys upon Aphides, and forms its burrows in dead twigs of the Bramble, Rose, &c.

Genus 7. PASSALÆCUS.

Pemphredon, pt., *Van d. Lind. Obs.* ii. 79 (1829).

Diodontus, pt., *Curtis, Brit. Ent.* xi. 496 (1835).

Xylæcus, *Shuck. Foss. Hym. Consp. Gen.* (1837).

Passalæcus, *Shuck. Foss. Hym.* p. 188 (1837).

Head subquadrate, wider than the thorax ; eyes ovate ; ocelli in a triangle on the vertex ; antennæ inserted at the base of the clypeus, not approximate ; clypeus transverse, tridentate, sometimes obsoletely so ; the labrum entire. Thorax sublinear ; collar transverse, slightly constricted into a sort of neck ; metathorax elongate, obtuse at its extremity ; the anterior wings with one marginal cell acuminate at its apex, and with two submar-

ginal cells, the first oblong, receiving the first recurrent nervure near its apex, the second broader than long, and narrowed towards the marginal cell, receiving the second recurrent nervure about the middle; the legs destitute of spines. Abdomen elongate, with a very short petiole, and having the second segment constricted at its base, the third being slightly so; the apex produced into an upcurved spine in the male.

1. *Passalæcus insignis*.

P. atra; mandibulis palpisque flavis; corniculo inter antennis obsoleto (♀), porrecto (♂).

Pemphredon insignis, *Van d. Lind. Obs.* ii. 79. 3 ♂ (non ♀).

Diodontus insignis, *Curtis, Brit. Ent.* fol. 797. pl. 797.

Passalæcus insignis, *Shuck. Foss. Hym.* 189. 1.

Dahlb. Hym. Europ. i. 248. 148.

Wesm. Hym. Foss. Belg. 122. 4.

Female. Length 3 lines.—Black; the disk of the thorax and the abdomen shining; the head very finely and closely punctured; an impressed line runs from the anterior ocellus to the middle of the face; the clypeus obsoletely tridentate; the labrum triangular; the scape in front, the mandibles, and the palpi, yellowish white. Thorax: the mesothorax and the scutellum very delicately punctured; the metathorax coarsely rugose; the tubercles white behind; the wings hyaline and iridescent, the tegulæ testaceous, the nervures piceous; the apex of the femora, and the tibiæ and tarsi ferruginous, the posterior tibiæ frequently with a dark stain in the middle. Abdomen very finely punctured, the margins of the three basal segments constricted.

Male. Length 2½ lines.—Differs in having the face silvery, and in having a short acute spine or horn between the antennæ, the tibiæ and tarsi yellow, and in having an upcurved spine at the apex of the abdomen.

Abundant, and generally distributed, frequenting the flowers of the Bramble. I have frequently bred this insect from perforated rose-sticks; but I have not observed it carrying its prey.

2. *Passalæcus gracilis*.

P. atra; mandibulis macula lactea; corniculo in utrisque sexibus deficiente.

Diodontus gracilis, *Curtis, Brit. Ent. xi.* 496.

Passalæcus gracilis, *Shuck. Foss. Hym.* 190. 2.

Dahlb. Hym. Europ. 242. 142.

Wesm. Hym. Foss. Belg. 121. 1.

Female. Length $2\frac{3}{4}$ lines.—Black and shining; the head delicately punctured; the clypeus marginate and obsoletely tridentate; the scape in front, and a broad stripe on the mandibles, yellow; palpi pale. Thorax: the mesothorax closely punctured; the scutellum very delicately so; the metathorax rugose and shining; the wings hyaline and iridescent; the tegulæ piccous; the anterior tarsi, and the knees and tarsi of the intermediate pair, pale ferruginous; the base of the posterior tibiæ pale yellow.

The *Male* only differs in having the face silvery, and the pale parts of the legs yellow.

3. *Passalæcus cornigera*.

P. atra; corniculo inter antennis porrecto (♀), obsoleto (♂).

Passalæcus cornigera, *Shuck. Foss. Hym.* 191. 3.

Dahlb. Hym. Europ. i. 245. 145.

Female. Length 2–3 lines.—Black; the head, and thorax on the disk, very delicately punctured; the metathorax coarsely rugose; the abdomen smooth, shining, and impunctate. An erect acute spine in the centre of the face, and an impressed line above it, extending to the anterior stemma; the clypeus tridentate, the central tooth largest; the scape in front and the tips of the mandibles rufescent; sometimes only the base and apex of the scape rufescent. Thorax: the epaulets of the tegulæ consute, a slight scratch parallel with their middle, and a consute line on each side near the middle, extending from the base to the apex, within which, at the base, there are two slight, abbreviated, slightly elevated lines. The tubercles white; the wings hyaline and iridescent; the tegulæ rufo-testaceous; the anterior and intermediate tibiæ and tarsi, the tips of their femora, and the base of the posterior tibiæ, fulvous; the apex of the posterior tibiæ sometimes also fulvous; a dark stain in the middle of the intermediate tibiæ. Abdomen: the margins of the three basal segments slightly constricted.

The *Male* has the spine on the face obsolete; the clypeus with a silvery pubescence; those parts of the legs which are fulvous in the female are luteous.

This and the preceding species are plentiful in the London district, and apparently widely distributed.

Genus 8. PEMPHREDON.

Crabro, pt., *Fabr. Ent. Syst.* ii. 293 (1793).

Sphex, pt., *Panz. Faun. Germ.* 52 (1804).

Pemphredon, *Latr. Hist. Nat. Ins.* xiii. (1805).

Cemonus, *Jurine, Hym.* 214 (1807).

Head large, subquadrate; eyes prominent and ovate; antennæ inserted at the base of the clypeus, not approximate, subserrate in the male; clypeus transverse; labrum small and triangular; mandibles stout, their apex dentate. Thorax ovate; the mesothorax very convex; the superior wings with one elongate marginal and two complete submarginal cells; the first submarginal as long as the marginal cell, and receiving the first recurrent nervure in the middle; the second submarginal quadrate, receiving the second recurrent nervure near its base; the legs very slightly spinose. Abdomen ovate-lanceolate, petiolated, the petiole slightly curved; terminated by an acute spine in the male, canaliculated in the female.

1. Pemphredon lugubris.

P. ater, pubescens; capite thoraceque subrugosis; metathorace confertim rugoso, margine oblique striato; abdominis petiolo longo.

Crabro lugubris, *Fabr. Ent. Syst.* ii. 302. 30.

Sphex unicolor, *Panz. Faun. Germ.* 52. 24.

Cemonus unicolor, *Panz. Krit. Revis.* ii. 187.

Jurine, Hym. t. 11. gen. 28.

Cemonus lugubris, *Jurine, Hym.* 214.

St. Farg. Hym. iii. 94. 1.

Pemphredon lugubris, *Latr. Hist. Nat. Ins.* xiii. 325.

Fabr. Syst. Piez. 315. 2.

Van d. Lind. Obs. ii. 80. 4.

Shuck. Foss. Hym. 196. 1.

Zett. Ins. Lapp. 441. 1.

Dahlb. Hym. Europ. 259. 159.

Wesm. Hym. Foss. Belg. 118. 1.

Pemphredon luctuosus, *Shuck. Foss. Hym.* 197. 2. var. ♂.

Female. Length 5 lines.—Black; head and thorax subopaque, the abdomen shining; the face closely covered with elongate punctures which run into striæ, the clypeus and vertex with distant punctures; the head with long griseous pubescence; the mandibles highly polished. Thorax with griseous pubes-

cence; the mesothorax with three abbreviated longitudinal impressed lines in front, and two deeper ones parallel with the tegulæ; the thorax is rugose; the metathorax with a semicircular space at its base, enclosed by an elevated ridge; the truncation with a deep fossule in the centre, the whole of the metathorax coarsely rugose; wings fusco-hyaline and iridescent, the nervures piceous, stigma black. Abdomen: the petiole rugose, longer than the first segment, and curved; the apex pubescent.

Male.—Differs in having the face clothed with silvery pubescence, in having the mesothorax punctured, not rugose, and the abdomen more elongate.

Var. a.—The limbus which encloses the semicircular space at the base of the metathorax smooth and shining.

I consider the variety of the male, which is Shuckard's *P. luctuosus*, nothing more than a variety: on examining numerous examples of that sex, intermediate approaches will be found; but I have never seen a female with any tendency to the variety.

This is one of the most abundant insects in the whole fossorial group; it burrows in posts, rails, &c. in a decaying state. Its cells are provisioned with different species of Aphides. I have observed it settle on a rose-tree, and scraping a number of Aphides into a ball, fly off with it, carrying it in front of its anterior legs, and under its head. •

Genus 9. CERATOPHORUS.

Pemphredon, pt., *Van d. Lind. Obs.* ii. 82 (1829).

Ceratophorus, *Shuck. Foss. Hym.* 195 (1837).

Head transverse, deeply excavated behind; eyes lateral and ovate; stemmata in a triangle; antennæ inserted at the base of the clypeus, not approximate; the clypeus deeply emarginate, the angles produced, subdentate; the labrum exposed, smooth, shining, oblong, and rounded at the apex; the mandibles bidentate; an obtuse tubercle in the centre of the face, just above the insertion of the antennæ. Thorax ovate; *the anterior wings with one marginal and two submarginal cells; the first submarginal cell oblong, receiving the first recurrent nervure beyond the middle; the second submarginal much broader than long, receiving the second recurrent nervure just within near its base, widest*

towards the marginal cell; the legs simple. Abdomen ovate, petiolated, the petiole very short; the apical segment canaliculated.

1. *Ceratophorus morio*.

C. ater; marginis metathoracis summo lævi, abdominis petiolo brevi.

Pemphredon morio, *Van d. Lind. Obs.* ii. 82. 5.

Shuck. Foss. Hym. 198. 3.

Ceratophorus morio, *Shuck. Foss. Hym.* 198 (note).

Dahlb. Hym. Foss. Europ. i. 256. 57.

Wesm. Hym. Foss. Belg. 118. 1.

Female. Length 3 lines.—Shining black; head punctured and slightly pubescent; an obtuse tubercle, sometimes slightly emarginate, in the centre of the face; the mandibles rufescent at their apex. Thorax: the mesothorax punctured; the scutellum smooth and shining, with a few fine punctures; the metathorax rugose, at its base a subcordiform space enclosed by a smooth shining margin; wings hyaline and iridescent, the nervures piceous, the stigma dark brown. Abdomen: the petiole rugose half the length of the first segment, and canaliculated down the centre; the apical segments sprinkled with silvery-white hairs.

The *Male* has the tubercle on the face less obtuse, and the mandibles tridentate.

This species appears to be rare. It is occasionally found in the neighbourhood of London, but I know of no other locality.

2. *Ceratophorus anthracinus*.

C. ater; capite subquadrato, tuberculo inter antennis obtuso; metathorace rugoso, basi spatio cordiformi, limbo angusto polito; alis sordide hyalinis.

Ceratophorus anthracinus, *Smith, Zool.* ix. *Append.* cxxvi.

Female. Length 4 lines.—Black; head nearly quadrate, closely punctured and subopaque, covered with thinly scattered cinereous pubescence; the face with an obtuse tubercle in the centre; the clypeus deeply and widely emarginate, its lateral angles prominent, subdentate; the labrum triangular, shining, and grooved down the centre. The metathorax rugose, with a subcordiform space at its base, enclosed by a very narrow shining margin; wings clouded, the second recurrent nervure uniting with the first transverse cubital nervure. Abdomen

smooth and shining, the apical segment coarsely punctured and deeply grooved down the centre.

I have some hesitation in describing this insect as distinct from *C. morio*; but the differently formed tubercle on the face, the closely punctured quadrate head, and difference in the venuration of the wings, appear to characterize a different species: unless some intermediate links unite them, I think it sufficiently distinct. This insect was captured in Devonshire.

Genus 10. CEMONUS.

Pemphredon, pt., *Latr. Gen. Crust. et Ins.* iv. 84 (1806).

Cemonus, pt., *Jurine, Hym.* 214 (1807).

Head large, subquadrate; eyes ovate and lateral; antennæ inserted at the base of the clypeus, not approximate; the clypeus produced in the centre of its anterior margin; the labrum small and triangular, the mandibles quadridentate, the inner tooth obtuse, the rest subacute. Thorax ovate; the metathorax rounded or obtusely truncate; *the superior wings with one marginal and two submarginal cells, the first submarginal receiving both the recurrent nervures, the first a little before the centre, the second near its extremity; the second submarginal cell subquadrate, widest towards the marginal.* Abdomen ovate and petiolated, the petiole curved, and about as long as the first segment.

1. *Cemonus unicolor*.

C. ater; metathoracis basi spatio cordiformi, limbo lævi mediocri utrinque crenatura circumscripto.

Pemphredon unicolor, *Latr. Gen. Crust. et Ins.* iv. 84.

Fan d. Lind. Obs. ii. 83. 6.

Zett. Ins. Lapp. 441. 2.

Curtis, Brit. Ent. xiv. t. 632.

Cemonus unicolor, *Jurine, Hym.* 214 (2nd Fam., note, without the synonyms).

Shuck. Foss. Hym. 200. 1.

Dahlb. Hym. Europ. i. 255. 155.

St. Farg. Hym. iii. 942.

Wesm. Hym. Foss. Belg. 119. 1.

Female. Length 4-4½ lines.—Shining black; the vertex distantly punctured, more closely so in front of the ocelli, the punctures running into striæ on the face; a deep longitudinal impression runs from the anterior stemma to the insertion of the antennæ;

the face with a slight silvery pubescence. Thorax: the mesothorax thickly punctured at the sides, sparingly so on the disk, a short impressed line on each side parallel with the epaulet of the tegulæ; the scutellum slightly punctured; the metathorax rugose at the sides and behind; at its base is a subcordate space enclosed by a distinctly defined shining margin, the space rugose; the metathorax is thinly covered with long griseous hairs; the wings fusco-hyaline, the nervures piceous; the legs slightly pubescent, the intermediate and posterior pairs slightly spinose. Abdomen very smooth and shining; the petiole rugose above and curved, about the length of the first segment, with a number of long griseous hairs; the terminal segment very glossy, and channeled towards its apex, which is thinly covered with longish pubescence.

Male.—Differs in having the face more silvery; the abdomen narrower, and the apex more produced and rufo-piceous, the tip acute.

This is a most abundant insect, and found in all parts of the country; it commonly burrows in dead sticks, particularly those of the Bramble and Rose; its larvæ are of an orange-red, and are provisioned with different species of Aphides.

2. *Cemonus lethifer*.

C. ater; metathoracis basi spatium cordiformi, limbo lævi sed summo non distincte circumscripto.

Cemonus lethifer, Shuck. Foss. Hym. 201. 2.

Dahlb. Hym. Europ. i. 254. 154.

Wesm. Hym. Foss. Belg. 119. 1.

Female. Length $3\frac{1}{2}$ – $4\frac{1}{2}$ lines.—This species only differs in the sculpturing of the metathorax, which has a subcordiform space at its base rugose, or longitudinally rugose-striate; and enclosed by a smooth shining limbus not defined at its outer margin.

The *Male* only differs in having the face more silvery.

This species closely resembles the preceding, but I consider it distinct. I have frequently bred both species, and have never found them intermixed: it is equally abundant with the former. Shuckard, in his generic characters, says, “mandibles quinque-dentate,” but describes *C. lethifer* as having quadridentate mandibles: both species have been carefully examined with the aid of a microscope, and only four teeth have been detected in the sexes of both species.

Genus 11. PSEN.

Psen, *Latr. Précis* (1796).

Sphex, pt., *Fabr. Ent. Syst. Suppl.* 243 (1798).

Pelopæus, pt., *Fabr. Syst. Piez.* 202 (1804).

Trypoxylon, pt., *Fabr. Syst. Piez.* 182 (1804).

Mimesa, pt., *Dahlb. Hym. Europ.* i. 2 (1843).

Mesopora, *Wesm. Hym. Foss. Belg.* 116 (1852).

Head transverse, as wide as the thorax; eyes ovate and lateral; the stemmata in a triangle on the vertex; the antennæ inserted in the middle of the face; the flagellum subclavate; the clypeus transverse, rounded in front; labrum concealed; the mandibles bidentate. Thorax short and ovate; the collar transverse; the anterior wings with one elongate marginal cell, which is acute at its apex, and three submarginal ones; the first oblong, the second much smaller and narrowed towards the marginal cell, the third larger than the second, oblique, and somewhat narrowed towards the marginal; the second submarginal receiving the first recurrent nervure a little before the middle, the third submarginal receiving the second recurrent nervure near its base; the legs simple. Abdomen oblong-ovate, with an elongate petiole at its base; the apex terminating in an upcurved spine in the males.

1. *Psen ater*.

P. ater; clypeo argenteo villosio; metathorace rugoso; petiolo elongato, lævissimo, polito. *Fæm.*

P. antennis ferrugineis, compressis, subserratis. *Mas.*

Sphex atra, *Fabr. Ent. Syst. Suppl.* 244. 18, 19.

Panz. Faun. Germ. 72. 7.

Pelopæus unicolor, *Fabr. Syst. Piez.* 204. 11.

Trypoxylon atratum, *Fabr. Syst. Piez.* 182. 5.

Psen atra, *Panz. Krit. Revis.* ii. 108.

Psen pallipes, *Spin. Ins. Lig.* i. 94. 2.

Psen serraticornis, *Jurine, Hym. tab.* 8. gen. 6 ♂.

Psen ater, *Van d. Lind. Obs.* ii. 102. 1.

Latr. Hist. Nat. Ins. xiii. 300?

Shuck. Foss. Hym. 225. 1.

St. Farg. Hym. iii. 40. 1.

Mimesa atra, *Dahlb. Hym. Europ.* i. 2, 3.

Mesopora atra, *Wesm. Hym. Foss. Belg.* 116. 6.

Female. Length 5 lines.—Shining black; the face densely covered with silvery pubescence; the mandibles obscurely ferruginous in the middle; the palpi pale rufo-testaceous; the antennæ rufo-piceous beneath. The mesothorax finely punctured; the metathorax obtusely rounded and coarsely rugose, at its

base a small enclosed space which is longitudinally grooved; from hence to the apex runs a deep central channel; the legs pubescent, the tarsi rufo-piceous, the posterior tibiae spinose, and the anterior tarsi ciliated exteriorly; the calcaria pale testaceous. Abdomen highly polished, and covered more or less with a fine silky white pile; the petiole smooth, shining, and slightly curved; the apical segment punctured, and margined at the sides towards its apex.

Male. Length $4\frac{1}{2}$ lines.—Differs in having the antennæ fulvous, more or less obscure above; the scape very large, the eighth, ninth and tenth segments concave beneath and serrated; the mandibles and palpi pale rufo-testaceous; the anterior and intermediate legs of a reddish yellow, the anterior tarsi yellowish; the intermediate tarsi ferruginous, the basal joint produced exteriorly, and with two short acute spines at the apex, the following joints slightly produced; the anterior and intermediate femora black beneath; the posterior tarsi rufo-piceous, the calcaria pale testaceous.

Var. Those parts which are described as reddish yellow, bright yellow.

This insect has hitherto been exceedingly rare. Some years ago I captured a pair near Hawley, Hants; and during the last season I saw one on a flower near Lowestoft, Suffolk; there are several in the collection of Mr. Kirby in the Entomological Society's Museum, probably taken in Suffolk.

2. *Psen pallipes*.

P. ater; clypeo argenteo, facie carinata; tibiis anticis subtus tarsisque omnibus ferrugineis aut piceis.

Sphex pallipes, Panz. *Faun. Germ.* 52. 22 ♂.

Trypoxylon atratum, Panz. *Faun. Germ.* 98. 15.

Psen atra, Panz. *Krit. Revis.* ii. 109.

Psen atratus, Van d. Lind. *Obs.* ii. 103. 2.

Shuck. Foss. Hym. 227. 2.

Dahlb. Hym. Europ. i. 5. 6.

St. Farg. Hym. iii. 40. 1.

Wesm. Hym. Foss. Belg. 116. 1.

Female. Length 3 lines.—Shining black; the head delicately punctured, the face covered with silvery pubescence; the flagellum fulvous beneath; a carina runs between the antennæ, passing upwards and uniting with a transverse one. Thorax sparingly and delicately punctured on the disk, with two or three slight scratches at the base of the mesothorax; the metathorax with a triangular depression at its base, in front longi-

tudinally striated, transversely so behind, with the sides delicately striated obliquely; the wings hyaline and iridescent; the legs pubescent; the anterior tibiæ in front and their tarsi ferruginous, the intermediate and posterior pairs piceous; the calcaria pale testaceous; the tibiæ slightly spinose. Abdomen pubescent towards the apex; the petiole shorter than the first segment, and canaliculated above; the apex of the fifth and sixth segments, sometimes the latter entirely, rufo-piceous, the apex slightly produced.

Male. Length $2\frac{1}{2}$ –3 lines.—Differs in having the antennæ considerably longer, as long as the head and thorax; the metathorax more roughly sculptured; the petiole as long as the first segment, and having a ferruginous upcurved spine at the apex of the abdomen.

Occasionally abundant; frequently availing itself of the tubes of straws in thatched roofs in which to construct its cells; these it provisions with Aphides.

Genus 12. MIMESA.

Trypoxylon, pt., *Fabr. Syst. Piez.* 182. 6 (1804).

Psen, *Latr. Nouv. Dict.* 2nd ed. 28 (1816).

Mimesa, *Shuck. Foss. Hym.* 228 (1837).

Head transverse, wider than the thorax; eyes ovate and lateral; stemmata in a triangle on the vertex; antennæ clavate, inserted in the middle of the face; the clypeus transverse; the mandibles bidentate. Thorax subglobose; the collar transverse; the metathorax short, and rounded behind; *the anterior wings with one elongate marginal cell, which is acute at its apex, and three submarginal cells, the second about half the length of the first, narrowed towards the marginal, and receiving both the recurrent nervures; the third oblong-quadrangle, widest towards the apex of the wing; legs short and spinose.* Abdomen petiolated, oblong-ovate; in the male armed at the apex with an upcurved spine.

1. *Mimesa equestris*.

M. atra; abdominis segmento primo et secundo rufo; petiolo basi attenuato, supra rugoso.

Trypoxylon equestre, *Fabr. Syst. Piez.* 182. 6.

Psen rufa, *Panz. Faun. Germ.* 96. 17.

Psen equestris, *Panz. Krit. Revis.* ii. 110.

Psen equestris, *Van d. Lind. Obs.* ii. 107. 4.

Curtis, Brit. Ent. i. t. 25 ♀.

Mimesa equestris, *Shuck. Foss. Hym.* 229. 1.

Dahlb. Hym. Europ. i. 4, 5.

Wesm. Hym. Foss. Belg. 109. 3 ?

Mimesa Shuckardi, *Wesm. Hym. Foss. Belg.* 115. 5 ♀ ?

Female. Length 4-4½ lines.—Black; the head and thorax slightly shining and punctured; the flagellum fulvous beneath, the apical joint usually entirely so; the tips of the mandibles ferruginous. The mesothorax with an impressed line on each side in front, extending to the apex; the metathorax rugose, with a triangular enclosed space at its base, which is coarsely striated longitudinally; the wings hyaline and iridescent, the nervures black, the tegulæ testaceous; the apical joints of the tarsi ferruginous; the anterior tarsi ciliated outside, the intermediate and posterior tibiæ spinose. Abdomen: the first and second segments ferruginous, the following, as well as the petiole, shining black; the petiole flat above, more or less rugose; the sides of the petiole bordered by elevated longitudinal carinæ, and having also a central carina, beneath flat, and slightly hollowed out at its extremity; the petiole wider at its apex than at its base.

Male.—Very like the female; but differs in having the silvery pubescence on the face denser; the antennæ longer; the tarsi usually more ferruginous, the sides only of the first segment red, sometimes with a black spot above; the apex of the abdomen furnished with an upcurved spine.

Var. The basal half of the third segment of the abdomen red.

Usually a scarce species, although widely distributed; it has occurred in Yorkshire, Isle of Wight, on Hampstead Heath, and also at Sandhurst, Berks. At Lowestoft, Suffolk, it is the common species, where I found it in great numbers.

2. *Mimesa bicolor*.

M. atra; abdominis segmentis tribus anticis rufis; petiolo lineari.

Psen bicolor, *Jurine, Hym.* t. 13 ♂.

Mimesa bicolor, *Shuck. Foss. Hym.* 230. 2.

Wesm. Hym. Foss. Belg. 113. 4.

Mimesa lutaria, *Dahlb. Hym. Europ.* i. 4. 4.

Psen equestris, *St. Farg. Hym.* iii. 43. 3.

Female. Length 3-4½ lines.—Head and thorax as in the preceding species; the tarsi usually more ferruginous, and the tips

of the tibiæ also. Abdomen: the petiole linear, as long as the first segment, and with a longitudinal carina above; the extreme base of the first segment black.

The *Male* only differs in having the face more densely covered with silvery pubescence, the legs more ferruginous, and the abdomen less red at its base.

A most abundant species, frequenting sandy districts; it forms large colonies, and furnishes its cells with a species of *Tettigonia*. I have taken it at Hampstead, Erith, Luccomb Chine, Isle of Wight, Yarmouth, Deal, Dover, and in Yorkshire.

3. *Mimesa Dahlbomi*.

M. atra; abdominis petioli carinula dorsali lanceolata, distincte sulcata; metathorace reticulato-rugoso.

Mimesa unicolor, *Dahlb. Hym. Europ.* i. 1. 1.

Psen unicolor, *St. Farg. Hym.* iii. 44. 4.

Mimesa Dahlbomi, *Wesm. Hym. Foss. Belg.* 108. 2.

Female. Length 4 lines.—Black; head and thorax punctured and shining; a carina runs from the anterior stemma to a transverse one which crosses at the insertion of the antennæ; the face with a slight silvery pubescence; the clypeus convex, its anterior margin reflexed, with a notch in the middle. Thorax: the scutellum smooth and shining; the metathorax reticulated, with a triangular space at its base obliquely coarsely striated; the wings subhyaline and iridescent, the nervures black, the tegulæ piceous; the claw-joint of the tarsi rufo-piceous, the calcaria pale testaceous. Abdomen smooth, shining, and covered beyond the basal segment with a fine silky white pubescence; the petiole narrowest towards its base, its lateral margins raised, and having a raised elongate lanceolate carina in the middle; the apical segment compressed, above with an elongate narrow angular space bordered on each side with a sharp carina, the space enclosed flat, shining, and delicately punctured.

Although the differences between this species and *Cemonus unicolor* are apparently not very great, still I agree with M. Wesmæel in considering them of specific value; the difference in the form and sculpture of the petiole, united with that of the anal segment, are certainly greater than of a mere variety. The only specimen I have seen is in the collection of British Hymenoptera in the British Museum; it was formerly in that of the late J. F. Stephens.

4. *Mimesa unicolor*.

M. atra, leviter griseo-pubescent; clypeo gibboso, facie argenteo-pubescente; metathorace reticulato-rugoso.

Psen unicolor, *Van d. Lind. Obs.* ii. 105. 3.

Mimesa unicolor, *Shuck. Foss. Hym.* 231. 3.

Wesm. Hym. Foss. Belg. 108. 1.

Mimesa borealis, *Dahlb. Hym. Europ.* i. 2. 2.

Pemphredon unicolor, *Curtis, Brit. Ent.* xiv. t. 632 ♂.

Female. Length $3\frac{1}{2}$ lines.—Black and shining; the head and disk of the thorax punctured; the face covered with silvery pubescence; a carina runs from the anterior stemma down the face, and terminates a transverse one which crosses at the insertion of the antennæ; the clypeus convex, its anterior margin reflexed, in the middle slightly emarginate; the tips of the mandibles ferruginous; the antennæ obscurely fulvous beneath towards their apex. Thorax: the metathorax reticulated; the scutellum smooth and shining, with a few scattered fine punctures; wings as in the preceding species, but with the third submarginal cell longer. Abdomen smooth, shining, and covered, except the first segment, with silky pubescence; the petiole linear, carinated above; the apical segment with a broad flat triangular space above, which is covered with coarse longitudinal punctures.

The *Male* has the face more densely covered with silvery pubescence, the antennæ longer, the tarsi rufo-testaceous, and the abdomen with an upcurved pale ferruginous spine.

Not uncommon, and widely distributed; once very plentiful, entering the straws of a thatched outhouse at Charlton, Kent.

Fam. 8. Philanthidæ.

Philanthidæ, *Dahlb. Hym. Europ.* i. 187 (1843–5).

Cerceridæ, *Wesm. Hym. Foss. Belg.* 98 (1852).

The head wider than the thorax; the intermediate tibiæ armed with a single spur at their apex; the legs with the anterior tarsi strongly ciliated.

Genus 1. PHILANTHUS.

Vespa, pt., *Fabr. Syst. Ent.* p. 362 (1775).

Craibro, pt., *Rossi, Mant.* i. 138 (1792).

Philanthus, pt., *Fabr. Ent. Syst.* ii. 288 (1793).

Simblephilus, *Jurine, Hym.* 185 (1807).

Head large, wider than the thorax, suborbiculate; eyes lateral, and slightly emarginate within; antennæ inserted above the clypeus in the middle of the face, not approximate; the clypeus trilobate; the mandibles acute at their apex. Thorax ovate, the metathorax obtusely rounded; *the anterior wings with one narrow, elongate, marginal cell and three submarginal cells; the second submarginal half the length of the first and narrowed towards the marginal, receiving the first recurrent nervure in the middle; the third submarginal narrowed half its width, towards the marginal;* the legs stout and spinose, the anterior tarsi strongly ciliated; the abdomen ovate, with the margins of the segments slightly depressed.

Of this fine genus we have but one British representative, and that has only occurred in one or two localities. The genus is, however, one of great extent, and species are found in most parts of the world. At the time of the publication of Shuckard's Essay in 1837, the *P. triangulum* was considered one of the rarest of the fossorial tribe; and in the work alluded to we find the observation, "I suspect it is extremely local; but when its *metropolis* shall be discovered, it will be taken abundantly." Fourteen years subsequent to this, being on an entomological visit to the Isle of Wight, I discovered the *metropolis* in Sandown Bay. It is not surprising that the author of the Essay should observe, "I expect it is a very bold insect;" its large head, eyes, and mandibles give it a bold and threatening look, so that any one, unacquainted with its manner, would be cautious in capturing it; for this, however, there is no occasion, as it is impossible to provoke it to use its sting; I captured great numbers with my fingers. The prey of the females is various—*Andrena fulvicrus*, *Halictus zonatus*, or more frequently *Apis mellifica*. I should observe, that the two former insects were principally preyed upon by the *Philanthi* which burrowed in the slopes of the Bay; but on the top of the cliffs the Andrenidæ were rare, whilst *Apis* was in great numbers on the flowers of the red clover; it therefore appears that the species which is plentiful near their burrows is preyed upon, as either is equally adapted to their purpose. What number of Bees serve for the nourishment of a single *Philanthus*, I did not ascertain; but, certainly, more would be required of *H. zonatus* than of *A. mellifica*, the former being a much smaller insect than the latter.

1. *Philanthus triangulum*.

P. niger; capite thoraceque flavo-pictis; abdomine flavo, segmentis macula dorsali triangulari nigra; alis flavo-hyalinis.

* *Vespa triangulum*, *Fabr. Syst. Ent.* 372. 49 ♀, & *Cab. Mus. Dom. Banks.*

Villers, Entom. iii. 276. 25.

Christ. Hym. p. 136.

Oliv. Encycl. Méth. vi. 693. 116.

Vespa limbata, *Oliv. Encycl. Méth.* vi. 693. 118.

Crabro androgynus, *Rossi, Faun. Etrus. Mant.* i. 138. 305.

Philanthus pictus, *Panz. Faun. Germ.* 43. 23 ♂.

Fabr. Syst. Piez. 362.

Philanthus apivorus, *Latr. Fourm.* 317. t. 12. f. 2.

Spin. Ins. Lig. i. 95. 1.

Philanthus discolor, *Panz. Faun. Germ.* 63. 18 ♂.

Philanthus triangulum, *Fabr. Ent. Syst.* ii. 289. 2; *Syst. Piez.* 302. 4.

Duméril. Consid. t. 59. f. 6, 7.

Van d. Lind. Obs. ii. 122. 2.

Shuck. Foss. Hym. 246. 1.

Dahlb. Hym. Europ. i. 187. 115.

St. Farg. Hym. iii. 342.

Wesm. Hym. Foss. Belg. 105. 6.

Simblephilus diadema, *Jurine, Hym.* t. 10. gen. 18 ♀.

Philanthus androgynus, *Curtis, Brit. Ent.* vi. t. 273 ♀.

Female. Length $6\frac{1}{2}$ – $7\frac{1}{4}$ lines.—Head and thorax black and shining; the head very closely punctured, the disk of the thorax much more distantly so; the face, clypeus, and a bifurcate spot above, yellowish white; the mandibles ferruginous, with their tips nigro-piceous; the flagellum obscurely fulvous beneath, with the apical joint brightly so; the head fulvous behind. Thorax: the collar, a spot on the tubercles and on the tegulæ in front, and the post-scutellum, yellowish white; the wings fulvo-hyaline, the nervures ferruginous; the legs yellow, with the coxæ, trochanters, and base of the femora black; the anterior tarsi strongly ciliated outside, and all the tibiæ spinose. Abdomen yellow, the extreme base of the segments and a triangular spot in the centre of each, black, the spots decreasing in size from the basal one.

Male. Length 4–6 $\frac{1}{4}$ lines.—It differs in having the spot above the clypeus trifurcate; it has also a yellow stripe behind the eyes; the legs are of a pale yellow; the abdomen black, with a yellow band on the segments, which is very much attenuated in the middle, the two apical segments yellow.

Var. a. With a large yellow spot on the scutellum and a yellow

stripe on the mandibles; the head fulvous behind, with a broad yellow stripe behind the eyes.

Var. β . The head black behind, and the fasciæ on the abdomen interrupted.

The two extreme varieties are given; several intermediate ones occur.

Captured once sparingly at Heron Court, Hants, and abundantly in Sandown Bay, Isle of Wight; five or six examples were taken some years ago in Pegwell Bay, near Ramsgate; two or three near Byfleet, Weybridge; and a male at Snarebrook, in Epping Forest. This fine insect appears in July and August.

Genus 2. CERCERIS.

Sphex, pt., *Linn. Faun. Suec.* 413 (1660).

Crabro, pt., *Fabr. Syst. Ent.* 374 (1775).

Vespa, pt., *Harris, Expos.* 127 (1776).

Philanthus, pt., *Fabr. Ent. Syst.* ii. 238 (1793).

Cerceris, *Latr. Hist. Nat. Ins.* xiii. 315 (1804).

Head wider than the thorax, subquadrate; the eyes ovate; ocelli in a triangle on the vertex; antennæ subclavate, inserted in the middle of the face; mandibles stout and tridentate. Thorax ovate, the collar transverse, the metathorax obtusely truncate; *the superior wings with one oblong marginal cell and three submarginal cells, the first longer than the two following, the second triangular, petiolated, and receiving the first recurrent nervure in the middle, the third receiving the second recurrent nervure near its base*; the legs stout and strongly spinose, the anterior tarsi ciliated exteriorly. Abdomen oblong, the first segment narrowed to half the width of the following, and subglobose; the margins of the segments constricted; the apical segment with a central portion bordered on each side by a sharp carina; on each side is an oblique plane also bordered by a carina, the three planes usually transversely rugose-striate.

This genus contains some of the most beautiful species in the whole tribe of fossorial Hymenoptera; they are found in all parts of the world. Some of the Indian species are the giants of the

family, being upwards of one inch in length. Amongst the species from South America, some are remarkable for their departure from the normal type of form, having the first segment of the abdomen prolonged into a long petiole; the Brazilian *Philanthi* also assume this formation, and have been separated from the rest by Klug, forming his genus *Trachypus*. Five species have been discovered in this country, and a sixth may probably be added, the *Philanthus emarginatus* of Panzer; four specimens are in the collection of British Hymenoptera in the British Museum, but there is a want of certainty as to the locality from whence they came.

There is no genus of Hymenoptera with which I am acquainted, the species of which prey upon such widely different insects for the nourishment of their young: the most abundant and most universally distributed species, *C. arenaria*, stores up different species of Curculionidæ, not confining itself even to those of a particular genus, the selection apparently being determined by the abundance of any species suitable for its purpose; thus, although *Strophosomus faber* is usually its prey, I have observed it conveying *Balaninus Nucum*; on another occasion I captured several with *Otiorhynchus sulcatus*. St. Fargeau imagined that the beetles were deposited by the *Cerceris* when soft and recently disclosed, but such is certainly not the case; the specimens of *O. sulcatus* were so hard, that it was with difficulty they could be pierced with a pin: the larva of *Cerceris* is not developed until the beetles have been buried some days, by which time the dampness of the ground renders them sufficiently soft for the larva to feed upon.

Cerceris interrupta I have observed provisioning its cells with *Apion rufirostre*; this species selects hard trodden pathways for its burrows.

Cerceris ornata is the most subject to variation in its colouring of any species of the genus; it provisions its nest with different species of *Haliecti*. I have captured it with *H. rubicundus*, *H. zonulus*, and *H. cylindricus* (females). This species is extremely partial to the flowers of the wild Bryony, to which it is sure to be attracted if that plant grows in the neighbourhood of its colony.

Cerceris labiata I have taken abundantly on several occasions; I captured it conveying specimens of *Halitica tabida*; it is fond of reposing on the flowers of the Herb-Yarrow (*Achillea Millefolium*).

1. *Cerceris arenaria*.

C. nigra; capite thoraceque flavo variis; abdomine fasciis quatuor (δ quinque) flavis, primo segmento punctis duobus flavis; tibiis tarsisque flavo-ferrugineis.

Sphex arenaria, *Linn. Faun. Suec.* 413. 1660; *Syst. Nat.* i. 946. 31.

Villers, Ent. iii. 235. 38.

Ratz. Forst. Ins. Bd. iii. 35. 5.

Vespa exultans et petulans, *Harris, Expos.* t. 37. f. 1 δ , f. 2 φ .

Crabro 5-cinctus, *Fabr. Mant.* i. 295. 11 δ .

Oliv. Encycl. Méth. vi. 514. 13.

Schrank, Faun. Boic. ii. 335. 2182.

Crabro arenarius, *Fabr. Mant.* i. 297. 20.

Philanthus arenarius, *Fabr. Ent. Syst.* ii. 290. 5; *Syst. Piez.* 303. 9.

Philanthus lactus, *Fabr. Ent. Syst.* ii. 291. 10; *Syst. Piez.* 305. 18.

Panz. Faun. Germ. 63. 11 φ .

Philanthus auritus, *Fabr. Ent. Syst. Supp.* 268. 1.

Cerceris auritus, *Latr. Hist. Nat. Ins.* xiii. 315. 1.

Spin. Ins. Ligur. 96. 1.

Cerceris lacta, *Curtis, Brit. Ent.* vi. fol. 269. t. 269 φ .

Cerceris arenaria, *Van d. Lind. Obs.* ii. 109. 3.

Shuck. Foss. Hym. 233. 1.

Dahlb. Hym. Europ. 205. 122.

St. Farg. Hym. iii. 16. 11.

Wesm. Hym. Foss. Belg. 100. 1.

Female. Length $6-7\frac{1}{2}$ lines.—Black; covered with confluent punctures, the head and thorax coarsely so; the second, third, fourth and fifth joints beneath ferruginous, sometimes the sixth also; the third joint, and sometimes the second also, entirely ferruginous; a semicircular spot on the clypeus, a large patch on each side extending upwards above the insertion of the antennæ, and an ovate spot behind the eyes towards their summit, yellow. Thorax: an interrupted line on the collar, a spot on the tegulæ in front, the post-scutellum, and a large oblong-ovate spot on each side of the metathorax, yellow; the legs reddish yellow; the coxæ, the anterior and intermediate femora at their base, and the posterior pair at their apex and above, black; wings subhyaline, the nervures testaceous, the tegulæ piceous behind, the apical margins of the wings with a fuscous border. Abdomen: a spot on each side of the basal segment, and a fascia on the four following segments, yellow; a broad band on the second segment deeply emarginate anteriorly; the two following narrower and more slightly and widely emarginate; that on the fifth segment is broad and slightly emarginate, or sometimes waved anteriorly;

the spaces between the carinæ on the apical segment transversely rugose.

Male. Length 5-6 lines.—Differs in having the scape in front, the mandibles outside, and the face entirely, yellow; two or three of the basal joints of the flagellum beneath, and one or two of the apical ones beneath, fulvous; the legs bright yellow, the posterior trochanters and a spot on their coxæ yellow; the spot behind the eyes, that on the sides of the metathorax, and on the basal segment of the abdomen, obsolete; the yellow bands on the abdominal segments much narrower; the spaces between the carinæ on the apical segment shining and punctured.

This is an abundant and widely distributed species; it burrows in hard, flat, sandy spots, appearing about the middle of July. I found it plentiful in Sandown Bay, Isle of Wight, in the middle of August. The females vary considerably in size, but very little in colouring.

2. *Cerceris labiata*.

C. nigra, flavo-variegata; clypeo allevato; abdomine fasciis quinque flavis; pedibus flavo-ferrugineis.

Mas.—Clypeo plano; pedibus flavis.

Crabro labiatus, Fabr. Ent. Syst. ii. 269. 11 ♀.

Crabro cunicularius, Schrank, Faun. Boic. ii. 334. 2181.

Crabro bidens, Schrank, Faun. Boic. ii. 335. 2183.

Philanthus labiatus, Panz. Faun. Germ. 63. 16 ♀.

Fabr. Syst. Piez. 303. 10.

Philanthus arenarius, Panz. Faun. Germ. 46. 2 ♂.

Cerceris nasuta, Latr. Gen. Crust. et Ins. iv. 94.

Cerceris labiata, Van d. Lind. Obs. ii. 111. 5.

Shuck. Foss. Hym. 236. 2.

Dahlb. Hym. Europ. i. 217. 129.

Wesm. Hym. Foss. Belg. 104. 5.

Female. Length 6 lines.—Black, punctured, and shining; the clypeus projecting from its base, its anterior margin rounded; the clypeus, a large semicircular spot on each side of the face, the basal half of the mandibles, and a minute spot behind the eyes, yellow; the edge of the clypeus black; the flagellum fulvous beneath. Thorax: the punctures on the disk oblong, running into striæ; the triangular enclosed space at the base of the metathorax longitudinally striated; an interrupted line on the collar, the tegulæ, and post-scutellum, yellow; wings

fulvo-hyaline, with their apical border fuscous; legs reddish yellow, with the coxæ, trochanters, and base of the anterior and intermediate femora, black. Abdomen: a spot on each side of the first segment, and a transverse band on the four following, yellow; the first band subinterrupted, the three following attenuated in the middle; the carinæ on each side of the central space parallel, the space finely rugose and opaque, the lateral spaces shining and punctured; beneath immaculate.

Male. Length 5 lines.—The clypeus with a very minute obtuse tubercle, or tooth, in the middle of its anterior margin; the flagellum fulvous beneath, the apical joint entirely so, and much bent and attenuated; the face yellow, extending a little above the clypeus on each side; the scape and basal joint of the flagellum in front, and the mandibles outside, yellow; a spot on each side of the collar, the tegulæ, post-scutellum, and the legs, yellow; the coxæ, anterior and intermediate femora at their base above, and the posterior femora at their apex, black, or rufo-piceous; the posterior tibiæ and tarsi slightly ferruginous. Abdomen: the first segment with a spot on each side, and the five following segments with bands much attenuated in the middle, yellow; the penultimate ventral segment with a pencil of rigid setæ at its lateral angles.

Having several times taken this species abundantly, I give my own experience of its range of variation: I have only taken a single specimen of the female with a small ovate spot on the head behind; such a variety occurs but rarely in Continental specimens; none of the British examples, that I have seen, have "a large ovate spot" on each side of the metathorax. Of the males, I have found them with the yellow spot on the first abdominal segment sometimes wanting, and the spot behind the eyes and that on the metathorax always obsolete.

This species occurs at Weybridge, Surrey; Hawley, Hants; at Southend plentifully, and at Kingsdown, near Walmer, Kent. At the latter locality I took the variety of the female with a yellow spot behind the eyes. Mr. Curtis has taken this species in Norfolk.

3. *Cerceris quinquefasciata*.

C. nigra, flavo-maculata; clypei divisione media convexa, tantum excavata; abdomine fasciis quinque flavis; pedibus flavo-ferrugineis.

Crabro 5-fasciatus, Rossi, Faun. Etrus. Mant. i. 139. 207.

Philanthus quinquecinctus, Panz. Faun. Germ. 63. 12 ♂ (nec Fabr.).

Philanthus interruptus, *Panz. Faun. Germ.* 63. 17 ♀.

Cerceris 5-fasciata, *Van d. Lind. Obs.* ii. 115. 9 (teste *Wesm.*).

Wesm. Hym. Foss. Belg. 103. 4.

Cerceris interrupta, *Shuck. Foss. Hym.* 238. 3.

St. Farg. Hym. iii. 7. 4.

Cerceris nasuta, *Dahlb. Hym. Europ.* i. 215. 128.

Female. Length 5 lines.—Black, punctured and shining; the clypeus very convex, and excavated in front; the base of the mandibles, the clypeus, a large semicircular spot on each side of the face, and a minute spot behind the eyes, yellow; the flagellum above fuscous or black, fulvous beneath, the apical joint entirely so. Thorax: a spot on each side of the collar, the tegulæ, and the post-scutellum, yellow; the legs flavo-ferruginous, with the coxæ, trochanters, and base of the anterior and intermediate femora, black, or frequently dark rufopiceous; sometimes the extreme base of the posterior femora stained; wings fulvo-hyaline, slightly fuscous at their apex. Abdomen: a transverse spot on each side of the first segment, and an attenuated band on the four following, sometimes interrupted; the two central carinæ on the apical segment widest apart at the base, the space between them opaque.

The *Male* of this species so strongly resembles that of the preceding, that it is only necessary to point out the distinctions: in this species the antennæ are proportionably shorter, the apical joint, although bent, is thicker, and the angles of the penultimate abdominal segment are much less strongly dentate, and the pencil of hairs at their apex shorter; the anterior margin of the clypeus is not toothed; it is also smaller, varying from $3\frac{1}{2}$ to $4\frac{1}{2}$ lines in length; the apical segment is naked in this species, whilst in *C. labiata* it is sprinkled with hairs.

This is a very local species: it occurs at Southend; at Birch Wood, Kent, and also at Lowestoft, Suffolk; it is usually found about the beginning of August; it delights in frequenting the flowers of the wild Parsnip. This is certainly the *5-fasciata* of Van der Linden, as M. Wesmael has verified by an examination of the typical specimens.

4. *Cerceris ornata*.

C. nigra, flavo-maculata; thorace interdum toto nigro; abdomine fasciis tribus flavis.

Philanthus ornatus, *Fabr. Ent. Syst.* ii. 290. 6; *Syst. Piez.* 394. 11.

Panz. Faun. Germ. 63. 10; *Krit. Revis.* ii. 174.

Crabro variabilis, *Schrank, Faun. Boic.* ii. 339. 2190.

Philanthus semicinctus, *Panz. Faun. Germ.* 47. 24.

Cerceris ornata, *Latr. Hist. Nat.* xiii. 317. 3; *Nouv. Dict.* ed. 2. v. 512.

Walck. sur le genre Halict. 80.

Van d. Lind. Obs. ii. 117. 13.

Shuck. Foss. Hym. 239. 4.

Wesm. Hym. Foss. Belg. 105. 6.

Cerceris variabilis, *Dahlb. Hym. Europ.* i. 196. 118.

Female. Length 5-6½ lines.—Black, shining, and punctured; the face below the insertion of the antennæ, the scape in front, and the mandibles, yellow; the flagellum beneath, except the basal joint, fulvous. Thorax: a yellow spot on the tegulæ; the wings fulvo-hyaline, with their apical margins faintly clouded, their anterior edge is also darker; the thorax has a thin cinereous pubescence; the triangular space at the base of the metathorax smooth and shining, with a few short scratches on each side at the base; the tibiæ, tarsi, and tips of the femora yellow, the latter usually inclining to ferruginous; the posterior tarsi more or less fuscous. Abdomen: a yellow band at the base of the second segment, and the third and fifth segments entirely yellow; the second segment frequently with a triangular black spot in the middle of its base, and the fifth with a central emargination.

Var. α. The abdominal bands entire.

Var. β. The band on the fifth segment reduced to a thin waved line,

Var. γ. A spot on each side of the collar, the post-scutellum, the second segment at the base, and the third, fourth and fifth segments, yellow; the fourth segment with a triangular black spot in the middle of its base.

Male. Length 4-5½ lines.—Very closely resembles the female, but usually has the yellow segments of the abdomen uninterrupted; in small examples, the fourth and fifth segments are entirely black, and the mandibles are black, or with merely a yellow dot at their base; in highly coloured examples, the third, fourth, fifth and sixth segments are yellow, and there is a yellow spot on the apical segment.

This variable and beautiful species is very abundant in many situations; it has occurred in the London district, frequently in the neighbourhood of Battersea, Putney, Wandsworth, &c.; in Kent, at Darenth, Foot's Cray, Gravesend, Canterbury, and Dover; in the Isle of Wight, and Hawley, Hants; it has also

been captured in Norfolk and Suffolk, and is, I suspect, very widely distributed; it is gregarious, and forms large colonies, frequently in hard footpaths; it is often found on the flowers of the wild Bryony.

5. *Cerceris sabulosa*.

C. nigra; thorace maculato; abdomine fasciis quinque pedibusque flavis; alis marginibus anterioribus fuscis.

Philanthus sabulosus, *Panz. Faun. Germ.* 63. 13 ♂.

Philanthus quadricinctus, *Panz. Faun. Germ.* 63. 15 ♀.

Cerceris fasciata, *Spin. Ins. Ligur.* i. 97. 2 ♀.

Cerceris quadricincta, *Latr. Hist. Nat. Ins.* xiii. 316. 2 ♀.

Van d. Lind. Obs. ii. 144. 8.

Shuck. Foss. Hym. 243. 5.

Dahlb. Hym. Europ. i. 212. 126 (nec var. β).

St. Farg. Hym. iii. 23. 15.

Lucas, Explo. Sc. Algér. iii. 254.

Wesm. Hym. Foss. Belg. 102. 3.

Cerceris sabulosa, *Shuck. Foss. Hym.* 244. 6 ♂.

Female. Length 5 lines.—Black, closely punctured and slightly shining; the face, a spot behind the eyes, the scape of the antennæ, and base of the mandibles, yellow; a black line on the scape behind; the flagellum fulvous beneath. Thorax: an interrupted line on the collar, a spot on the tegulæ, and the post-scutellum, yellow; the legs yellow; the coxæ, anterior and intermediate trochanters and femora, except the apex of the latter and the apex of the posterior femora, black; the posterior tarsi fusco-ferruginous; wings slightly fulvous, with a dark fuscous stain occupying the marginal cell and passing onwards to the apex of the wings. Abdomen: the second and fifth segments yellow, and the third and fourth with a narrow attenuated band at their apical margins; the longitudinal carinæ on the apical segment rather wider apart at the base than the apex, the intermediate space finely rugose and opaque.

Var. a. A yellow spot behind the eyes.

Male. Length 4½ lines.—Black; the face, scape in front, and the mandibles at their base, yellow; the flagellum fulvous beneath; the scape sometimes entirely yellow. Thorax: a spot on each side of the collar, the tegulæ, the post-scutellum, and the tibiæ, tarsi, and apex of the femora, yellow; wings fulvo-hyaline, with a fuscous stain in the marginal cell, and continuing to the apex of the wings. Abdomen: a yellow band on the second and four following segments, that on the second

segment being at its base, those on the third and sixth usually occupying the entire segments, those on the fourth and fifth attenuated in the middle.

Var. *α*. An interrupted line on the scutellum yellow.

Var. *β*. An ovate yellow spot on each side of the metathorax.

This is certainly a very local, if not a rare species; it has occurred at Faversham and at Canterbury, Kent. I know of no other locality.

Tribe III. DIPLOPTERA, Latr.

Consisting of two sexes in the Solitary group, males and females: to the communities of the Social Wasps are added workers, or neuters, sometimes termed abortive females; the females, as well as the workers, furnished with a sting. The anterior wings folded longitudinally in repose; the prothorax prolonged backwards to the base of the wings; the eyes reniform, lateral, and extending to, or nearly to, the base of the mandibles; the anterior and intermediate tibiae furnished with a single spine at their apex, the posterior pair having two spines; the claws of the tarsi bifid in the Solitary species, but simple in the Social group.

There is not, perhaps, a more universally distributed tribe of insects than the Wasps; some species inhabit all parts of the known world. The genera which appear to be the most widely distributed are *Odynerus* and *Eumenes*, both belonging to the Solitary division. The genera belonging to the Social group, on the contrary, are limited in their geographical range: the typical genus, *Vespa*, has not been found in Africa, Australia, or in South America. The distribution of particular species is remarkable—the *Vespa vulgaris* of Europe is found in North America, and *Vespa rufa* occurs at Hudson's Bay.

The interest attached to the æconomy of these insects rivals that of the Hive-Bee; and the structures which are built by many of the exotic social species are amongst the most beautiful examples of the architecture of insects; but it will be best to detail the æconomy and habits of the British species under their respective genera.

Fam. 1. Eumenidæ, Westw.

(SOLITARY WASPS.)

Genus 1. EUMENES.

Vespa, pt., *Linn. Faun. Suec.* 415 (1761).*Sphex*, pt., *Christ. Hym.* 315 (1791).*Eumenes*, *Latr. Hist. Nat. Ins.* (1802).

Head subtriangular, not quite so wide as the thorax; the mentum about half the length of the labium, the latter deeply incised at the apex, forming two distinct appendages, each having a gland at its apex; the paraglossæ a little shorter than the tongue, straight, and glandular at their apex; the labial palpi 4-jointed, the two basal joints elongate, the third shorter, and the apical joint half the length of the third joint; the maxillary palpi 6-jointed, the basal joint longest, the following joints each shorter than the preceding; the clypeus produced, and notched at the apex; the mandibles narrow and elongate, straight, and forming as it were a beak, their inner margin notched towards the apex; the antennæ clavate, the apical joint hooked in the males. The wings ample, the anterior pair with one marginal and three submarginal cells, the second receiving both the recurrent nervures. Abdomen pyriform, the basal segment narrowed into a petiole at its base.

Of this genus we have only one representative in Britain, the *Vespa coarctata* of Linnæus. This wasp constructs small globular cells of mud, which it attaches to twigs of shrubs, particularly those of the common Hawth; each nest or cell is provisioned with the larvæ of small Lepidoptera, and contains a single larva of the wasp. I have more than once reared the *Eumenes* from such nests, but on one occasion I found a parasite belonging to the genus *Cryptus*. The *Vespidæ* are subject to the attacks of various parasites, belonging to the families *Ichneumonidæ*, *Chrysididæ*, *Syrphidæ*, and *Staphylinidæ*.

1. *Eumenes coarctata*.

E. nigra, flavo-variegata; prothoracis margine antico, tibiis tarsisque flavis; abdominis segmentis flavo-marginatis, segmento secundo punctis duobus flavis.

Vespa coarctata, Linn. *Syst. Nat.* i. 950 ♀, & *Cab. Mus. Linn. Soc. Fabr. Syst. Ent.* 370. 39; *Ent. Syst.* ii. 276.

Villers, Ent. iii. 268.

Oliv. Encycl. Méth. vi. 671.

Vespa pedunculata, Panz. *Faun. Germ.* 63. 8.

Vespa coronata, Panz. *Faun. Germ.* 63. 12.

Eumenes atricornis, Curtis, *Brit. Ent.* i. fol. 13. tab. 13 ♀.

Eumenes coarctata, Smith, *Cat. Brit. Hym.* 44. 1.

Sauss. Mon. Guêpes Sol. ii. 31. 2.

Female. Length 6 lines.—Black; the head and thorax slightly shining, closely punctured, as well as the basal segment of the abdomen, the second and following segments smooth, shining, and delicately punctured. A spot between the antennæ, sometimes a line at the base of the clypeus, and a minute spot behind the eyes, yellow. Thorax: the anterior margin of the prothorax, the outer margin of the tegulæ, the post-scutellum, and the tibiæ and tarsi, yellow; the tibiæ with a dark stain at their apex behind, and the apical joints of the tarsi fusco-ferruginous; wings subhyaline, with a slight fuscous stain along the anterior margin of the superior pair. The abdomen has a fine changeable silky pile, and the basal segment, as well as the metathorax, a thin cinereous downy pubescence; the pubescence on the disk of the thorax, and on the vertex, brown; the yellow band on the second segment of the abdomen is continued beneath.

Var. a. The basal segment of the abdomen with a minute yellow spot on each side.

Male.—Closely resembles the female, but differs in having the scape in front and the clypeus entirely yellow; the apical hook of the antennæ reddish yellow; the tibiæ and tarsi entirely yellow, the claw-joint only fuscous; the basal segment in rare instances with a minute yellow spot on each side.

A very local insect; but has been taken at Blackwater and Parley Heath, Hants; at Sandhurst, Berks; not uncommon at Sunning Hill; and has occurred sparingly at Weybridge.

Genus 2. ODYNERUS.

Vespa, pt., Linn. *Syst. Nat.* i. 948 (1766).

Epipone, Latr. *Hist. Nat. Ins.* (1804).

Odynerus, Latr. *Hist. Nat. Ins.* (1804).

Pterochilus, Klug, *Web. u. Mohr. Beitr.* i. (1805).

Symmorphus, Wesm. *Mon. Odyn. Belg.* (1833).

Oplopus, Wesm. *Mon. Odyn. Belg.* (1833).

Ancistrocerus, Wesm. *Mon. Odyn. Belg.* (1833).

The labium rather short, broad, and deeply notched at the apex, the margins of the notch fringed with pubescence; the paraglossæ nearly as long as the labium; the labial palpi 4-jointed, the basal joint as long as the three following, the apical one minute. The maxillary palpi 6-jointed, the basal joint stout, the following joints each becoming more slender to the apical joint. Antennæ simple, terminated by a hook, or with the apical joints spiral in the males.

This genus of Wasps is spread over all parts of the world. In this country we have, as I believe, only twelve known species; their discrimination is extremely difficult, the colouring being very inconstant, at least in two of the most abundant species; these are united in one species by Saussure in his monograph of the Solitary Wasps: the reasons which have induced me to differ from such an authority are, the fact of my having bred the insects, and never having found what Saussure considers varieties, mixed, and at the same time having found constant characters to separate them. The species are here divided into sections in accordance with the divisions made by Wesmæl in his monograph of the *Odyneri* of Belgium.

Some of the species burrow in wood; *Odynerus trifasciatus* selects partly decayed rails, posts, or fencing. I have bred the sexes, and have found scarcely any appreciable tendency to vary in this species.

Odynerus quadratus constructs its cells in old posts, &c., but frequently, if not always, prefers some ready-made tunnel or hole suitable to its œconomy; it is recorded by Mr. Ingpen to have constructed its cells in the foldings of a piece of paper that had fallen behind some books. I have found it making use of the tubes of reeds used in thatching an outhouse in a farm-yard; but the most curious adaptation I have heard of, is its lining the bores of a double-barreled pistol which hung on a post in an arbour of a garden. It is stated to have been observed to store up Diptera; but I have always found it to select the small green larvæ of Lepidoptera, probably of a species of *Crambus*.

From a number of cells which I discovered in a hard sand-bank, provisioned with small green caterpillars, I reared several specimens of *O. Antilope*; the contents of each cell were placed in a separate pill-box; and from two, I not only obtained a male *Odynerus*, but also a specimen of *Hedychrum auratum*.

Odynerus spinipes is commonly subject to the parasitic attacks of *Chrysis bidentata*, and I have occasionally observed *Hedychrum auratum* entering its burrows. This wasp constructs the

beautiful granular tubes, as entrances to its burrows, which are frequently met with during the early part of summer on sand-banks.

Odynerus lævipes and *melanocephalus* both burrow in dead bramble-sticks, or in those of the rose; the former lines the excavated tube with a coating of fine sand, and constructs the divisions between the cells of the same material; it stores up small caterpillars, and is subject to the attacks of two species of Ichneumon, *Cryptus ornatus* of Gravenhorst, and *C. bellosus* of Curtis.

Odynerus crassicornis is apparently the rarest species of the genus. I once captured it burrowing in a hard sand-bank near Darenth Wood, in Kent. Mr. Westwood observed this insect, near Paris, conveying the larvæ of *Chrysomela Populi*.

Div. 1. Symmorphus, Wesm.—The antennæ simple in both sexes; the first segment of the abdomen with a transverse suture at its base above, bordered by an elevated ridge, the segment funnel-shaped and subpetiolated, and having a longitudinal impressed line above.

1. *Odynerus crassicornis*.

O. niger; metathorace rugoso, postice nitido; abdominis segmentis quinque flavo-marginatis; capite thoraceque flavo-variegatis.

Vespa parietum, Fabr. Ent. Syst. ii. 265. 45; Syst. Piez. 261. 44.
Schrank, Faun. Boic. ii. 253. 2208.

Odynerus parietum, Latr. Hist. Nat. Ins. xiii. 347.
Spin. Ins. Lig. ii. 180.

Vespa crassicornis, Panz. Faun. Germ. 53. 8.
Schæff. Icon. Ins. Ratisb. t. 24. f. 3.

Vespa bipunctata, Villers, Ent. iii. 24.

Odynerus crassicornis, Wesm. Mon. Odyn. Belg. 39. 8.
St. Farg. Hym. ii. 663. 41.

Sauss. Mon. Guêpes Sol. 123. 1, & Supp. 117. 79. t. 10. f. 2 ♀.

Female. Length 5–6 lines.—Black and punctured; the punctures on the disk of the thorax shallow and distant; the sides of the metathorax and the post-scutellum rugose, the truncation of the metathorax shining; the abdomen shining, the basal segment strongly punctured, the rest delicately so. The clypeus emarginate, forming at the lateral angles of the emargination a short recurved tooth or spine. A large transverse macula at the base of the clypeus, the scape of the antennæ in front, and a narrow

transverse line between their insertion, yellow; sometimes a minute yellow dot behind the eyes. Thorax: a large spot on each side of the prothorax anteriorly, a smaller one beneath the wings, the tegulæ, two ovate spots on the scutellum, the tibiæ, tarsi, and tips of the femora, yellow; wings hyaline, slightly stained along the anterior margin of the superior pair, the nervures fuscous, becoming ferruginous at the base of the wings; a ferruginous stain on the tegulæ; a black or fuscous line on the anterior and intermediate tibiæ beneath; the tarsi slightly ferruginous, with the claw-joint fuscous. Abdomen: the apical margins of the segments bordered with yellow, that on the second segment broad, and slightly narrowed in the middle; the apical segment immaculate.

The *Male* has the mandibles and clypeus, except their margins, yellow; the apical joints of the antennæ yellow beneath. This insect has been regarded as the *Vespa muraria* of Linnæus, which it very closely resembles; a comparison, however, of this and the Linnæan type in the cabinet at the Linnæan Society satisfactorily proves them to me to be distinct. In "*muraria*," the head is more prolonged behind the eyes; the scape black; there is no spot beneath the wings or on the scutellum; the truncated portion of the metathorax not shining, and strongly striated, and the bands on the abdomen much narrower.

This species is very local, and probably nowhere abundant; in the British Museum collection there is only a single specimen, from the Stephensian Collection; it is the *O. Eumenoides* of Stephens's 'Systematic Catalogue.' In 1837 I captured a single female at Darenth, since which time I have not met with it.

2. *Odynerus sinuatus*.

O. niger; thorace quadrimaculato; abdomine fasciis tribus flavis, antice subsinuatis; tibiis tarsisque flavo-variegatis.

Vespa sinuata, *Fabr. Ent. Syst.* ii. 270; *Syst. Piez.* 264. 61.

Odynerus bifasciatus, *Spin. Ins. Lig.* i. 184.

Wesm. Mon. Odyn. Belg. 45. 8.

St. Farg. Hym. ii. 665. 44.

Sauss. Mon. Guêpes Sol. 124. 3.

Symmorphus bifasciatus, *Wesm. Mon. Odyn. Belg. Supp.* 2. 10.

Odynerus connexus, *Curtis, Brit. Ent.* iii. 138. t. 138.

Odynerus sinuatus, *Sauss. Mon. Guêpes Sol. Supp.* 192. 86.

Female. Length 4 lines.—Black; head, thorax, and basal segment of the abdomen punctured, the latter coarsely so; the

metathorax rugose, with the concave posterior truncation shining, and finely striated obliquely. Two united spots between the antennæ, a minute spot behind the eyes, a spot on each side of the prothorax, two on the scutellum, and one beneath the wings, yellow; the anterior and intermediate tibiæ in front and at their base, the posterior pair at their base, and the basal joints of the tarsi, yellow. The two basal segments of the abdomen with broad yellow fasciæ, the fourth with a narrow one, the anterior fascia notched in the middle, the second sinuated on each side.

Male. Length $2\frac{1}{2}$ –3 lines.—Differs from the female in having a yellow spot on the clypeus, in usually wanting the spots on the thorax, and in sometimes having the third fascia of the abdomen wanting.

Generally distributed. Specimens have been received from Scotland, and I have taken it in the Isle of Wight.

3. *Odynerus gracilis*.

O. niger, punctatus; capite thoraceque flavo-guttatis; abdomine flavo-fasciato.

Odynerus gracilis, Brullé, *Expéd. Sc. de Morée, Ins.* iii. t. 50. f. 3.

Odynerus elegans, Wesm. *Mon. Odyn. Belg.* 42. 7.

St. Farg. Hym. ii. 665. 13.

Herr. Schöff. Faun. Germ. 154. 17.

Sauss. Mon. Guêpes Sol. 124. 2.

Symmorphus elegans, Wesm. *Mon. Odyn. Belg. Supp.* 2. 9.

Female. Length 5–6 lines.—Black, punctured; two spots at the base of the clypeus, two united ones between the antennæ, the scape in front, and two minute dots behind the eyes, yellow. The lateral angles of the anterior margin of the prothorax very acute or subspinose, the metathorax entirely rugose; a spot on each side of the prothorax in front, a spot beneath the wings, the outer margin of the tegulæ, two spots on the scutellum, the tibiæ and anterior tarsi, yellow; all the tibiæ with a black stain behind, the tarsi more or less fusco-ferruginous, with the tips of the femora yellow; wings subhyaline, slightly smoky anteriorly. The first and second segments of the abdomen with broad yellow fasciæ sinuated on each side anteriorly, the third and fourth fasciæ much narrower; the abdomen shining, its basal segment strongly punctured, its apical margin thickened and elevated.

The *Male* differs in having the clypeus yellow, the scutellum black, immaculate, and the apex of the antennæ fulvous beneath.

A plentiful and generally distributed species.

Div. 2. *Oplopus*, Wesm.—The antennæ of the males with the apical joints rolled spirally. The basal segment of the abdomen dome-shaped, not having a suture or carina at its base above, or a central impressed line.

4. *Odynerus spinipes*.

O. maculâ inter antennis abdomineque fasciis quinque flavis.

Vespa spinipes, Linn. *Faun. Suec.* p. 409. 1682 ♂; *Syst. Nat.* i. 950. 10; & *Cab. Mus. Linn. Soc.*

Fabr. Syst. Ent. 368. 28; *Ent. Syst.* ii. 268. 55; *Syst. Piez.* 263. 54.

Rossi, Faun. Etrus. ii. 86. 868.

Panz. Faun. Germ. 17. 18.

Vespa muraria, Christ. *Hym.* 233.

Odynerus spinipes, Spin. *Ins. Lig.* i. 89. 3.

Latr. Hist. Nat. Ins. xiii.

Wesm. Mon. Odyn. Belg. 6. 2.

Shuck. Loud. Mag. Nat. Hist. new ser. i. 490. 1.

St. Farg. Hym. ii. 608. 2.

Sauss. Mon. Guêpes Sol. 223. 131.

Odynerus murarius, Latr. *Hist. Nat.* xiii.

Guêpe solitaire, Reaum. *Ins.* vi. 251. pl. 26. f. 2 ♀ and nest.

Female. Length 5½ lines.—Black; the head and thorax covered with confluent punctures, and thinly clothed with black pubescence; the clypeus slightly notched, with the angles rounded; an abbreviated line at the inner orbit of the eyes, a transverse one above the insertion of the antennæ, a minute one behind the eyes, and the extreme base of the scape in front, yellow. The anterior margin of the prothorax, the exterior margin of the tegulæ, the tibiæ, tarsi, and tips of the femora, yellow; the anterior and intermediate tibiæ with a dark stain behind, and the tarsi more or less fusco-ferruginous; wings fulvo-hyaline, with the anterior and apical margins clouded. Abdomen ovate, smooth and shining, the apical margins of the segments with narrow yellow fasciæ.

Male.—Rather smaller, with the clypeus deeply notched, and, as well as the mandibles, labrum, and antennæ beneath, yellow, the apical joints of the latter spiral; the legs usually yellower

than in the female, and the intermediate femora tridentate beneath.

This insect is very abundant in sandy lanes during the months of June and July; large colonies are frequently met with: the females store up small green caterpillars as food for the larvæ; the latter, however, are preyed upon by species of *Chrysididæ*, especially *Chrysis bidentata*; but I have taken *C. ignita* and *C. fulgida* hovering about their burrows.

5. *Odynerus lævipēs*.

O. niger, glaber, nitidus; clypeo bidentato, flavo-variegato; tibiis tarsisque rufo-flavis (♀); tibiis tarsisque flavis, femoribus intermediis inermibus (♂).

Odynerus lævipēs, *Shuck. Loud. Mag. Nat. Hist.* new ser. i. 490.
Sauss. Mon. Guêpes Sol. 228. 137.

Odynerus rubicola, *Dufour, Ann. Sc. Nat.* 2nd ser. xi. 102.

Odynerus reniformis, *St. Farg. Hym.* ii. 606 ♀, nec ♂.

Female. Length $4\frac{3}{4}$ –5 lines.—Black and shining, the head and thorax closely and deeply punctured, and sparingly covered with cinereous pubescence; the head more quadrate than in *O. spinipes*, and the cheeks somewhat swollen; the clypeus deeply emarginate, not so coarsely punctured as the head, an oblique line on each side at its base, two united spots between the antennæ, and a small dot behind the eyes, yellow. Thorax: an interrupted line on the prothorax, a dot in front and behind on the tegulæ, the extreme apex of the femora, the tibiæ and tarsi, testaceous yellow. Abdomen very delicately punctured, and with a narrow yellow fascia on each of the first five segments, that on the fifth usually abbreviated on each side, the second rather the widest, and slightly dilated at the sides.

Var. a. With two minute spots on the scutellum.

The *Male* is rather smaller than the female, and differs in having the clypeus more deeply notched and yellow, as well as the mandibles, labrum, and scape in front, the two penultimate joints of the flagellum being ferruginous; the tegulæ black, with sometimes a minute dot in front; the intermediate coxæ in front, and sometimes a line on the posterior pair, yellow; the sixth segment of the abdomen has sometimes an abbreviated yellow line. The intermediate femora not toothed.

In the year 1836 I collected a number of perforated bramble-

sticks, from which, in the following season, I bred this rare species. It proved to be new to science, and was described by Mr. W. Shuckard in 'Loudon's Magazine,' with a detailed account of its development as observed by myself; since that period I have obtained two or three specimens from sticks collected at Hampstead. Mr. Walcott has frequently bred it from bramble-sticks collected near Bristol.

6. *Odynerus melanocephalus*.

O. niger; abdomine albo-fasciato; antennis subtus ferrugineis (♀); antennis subtus flavis, apice nigricantibus (♂).

Vespa melanocephala, *Gmel. ed. Syst. Nat.* i. 2760. 96 ♀.

Vespa albo-fasciata, *Rossi, Faun. Etrus.* ii. 143. 870.

Vespa spinipes, *Oliv. Encycl. Méth.* vi. 687. 87 ♂.

Odynerus melanocephalus, *Wesm. Mon. Odyn. Belg.* 12. 3.

Sauss. Mon. Guêpes Sol. 224. 132.

St. Farg. Hym. ii. 610. 3.

Pterochilus dentipes, *Herr. Schäff. Faun. Germ.* 173. t. 3 ♀.

Pterochilus tinniens, *Herr. Schäff. Faun. Germ.* 6. t. 16 ♂.

Oplopus melanocephalus, *Wesm. Mon. Odyn. Belg. Supp.* 2. 3.

Female. Length 4½ lines.—Black; head and thorax shagreened, the abdomen very smooth and shining; the anterior margin of the clypeus very slightly emarginate. A spot between the antennæ, the scape in front, a minute dot behind the eyes, and an interrupted line on the prothorax, yellowish white; the flagellum fulvous beneath towards its base; the tegulæ and legs reddish yellow, with the coxæ, trochanters, and base of the femora, black; the wings fulvo-hyaline, and slightly fusco-ferruginous anteriorly. Abdomen: the margins of the first four segments narrowly bordered with white, the second slightly widened laterally.

The *Male* differs in having the clypeus, labrum, and mandibles yellowish white, the flagellum more brightly fulvous beneath, and the spiral joints rufo-fusca; the clypeus deeply emarginate; the fascia on the prothorax not interrupted; the anterior and intermediate coxæ with usually a yellow spot in front, and the intermediate femora tridentate beneath; the fifth and sixth segments of the abdomen with a narrow white fascia, more or less abbreviated at the sides.

This is a very local species; it occurs at the back of the Isle of Wight, and in the neighbourhood of Bristol.

DIV. 3. *Ancistrocerus*, *Wesm.*—The antennæ of the males terminated by a hook; a transverse suture on the first segment of the abdomen at its base above; the meta-thorax truncate from the margin of the post-scutellum.

7. *Odynerus parietum*.

O. niger; clypeo maculis, puncto inter antennis, thorace antico, scutello maculis duabus abdomineque fasciis quinque flavis.

Vespa parietum, *Linn. Faun. Suec.* 416. 1673; *Syst. Nat.* i. 949.

6 ♀; & *Cab. Mus. Linn. Soc.*

Rossi, Faun. Etrus. ii. 141?

Oliv. Encycl. Méth. vi. 686.

Vespa sexfasciata, *Fabr. Ent. Syst.* ii. 268. 56 ♂; *Syst. Piez.* 263. 55.

Vespa emarginata, *Fabr. Ent. Syst.* ii. 267. 51 ♂; *Syst. Piez.* 263. 50.

Vespa angulata, *Don. Brit. Ins.* xiv. 71. t. 495. f. 1 ♀.

Vespa aucta, *Panz. Faun. Germ.* 81. 17 ♂, var.

Odynerus parietum, *Curtis, Brit. Ent.* iii. 137 ♀; *Wesm. Mon.*

• *Odyn. Belg.* p. 16, *Supp.* p. 4.

Zett. Ins. Lapp. 455. 1.

St. Farg. Hym. ii. 656. 38.

Sauss. Mon. Guêpes Sol. i. 130. 10, *Supp.* pl. 11. f. 4.

Odynerus affinis, *Herr. Schöff. Faun. Germ. fusc.* 173. 21. t. 24.

Odynerus auctus, *Herr. Schöff. Faun. Germ.* 173. 22.

Odynerus murarius, *Blanch. Règ. An. Illustr. Ins.* t. 124. f. 3.

Female. Length $5\frac{1}{2}$ – $6\frac{1}{4}$ lines.—Black; head and thorax very closely punctured; the clypeus emarginate in front, the lateral angles produced, subdentate. The clypeus yellow, with a black bell-shaped spot in the middle, sometimes with two spots at the base, uniting at the sides with two smaller anterior spots, or the four spots separate; the scape in front, a spot between the antennæ, a minute one on the mandibles at their base, and a dot behind the eyes, yellow. Thorax: a transverse fascia on the prothorax, the tegulæ and a spot beneath the wings, two spots on the scutellum, and the tibiæ, tarsi, and tips of the femora, yellow; the posterior tibiæ sometimes with a fuscous or black spot at their apex within, the tarsi usually more or less fusco-ferruginous; the wings fulvo-hyaline, the nervures ferruginous, palest towards the base of the wings; a fuscous cloud in the marginal cell, which passes beyond to the apex of the wing. Abdomen shining and punctured, the basal segment most strongly so; the apical margins of the segments bordered with yellow, the basal one very broad, and emarginate in front, sometimes with an angular notch.

Male. Length $3\frac{1}{4}$ –5 lines.—Differs in having the clypeus, labrum,

and mandibles yellow; the flagellum fulvous beneath, and the two apical joints entirely so; the spot beneath the wings wanting; otherwise resembling the female; *the head and thorax in both sexes with a thin rufous pubescence.*

This is a very variable species: the form of the band on the basal segment is very inconstant, being widely emarginate, angularly notched, bordering the posterior margin of the segment and the sides; or, in rare instances, the basal segment is yellow above, with a small quadrate spot in the middle: the colouring of the tarsi is also very variable; the posterior pair, or the intermediate and posterior pairs, dark fuscous; at other times they are stained with ferruginous. Notwithstanding the great variations to which this species is subject, I am not prepared to consider the *O. quadratus* of Panzer as synonymous, as has been done by Saussure; or perhaps I should say, I feel sure that two species are mixed by that author. My reason for adopting this opinion is, that I bred the following insect,—every specimen exactly agreeing with the description, without the slightest tendency to partake of the form or colouring of the abdomen of *O. parietum*.

8. *Odynerus quadratus*.

O. niger; clypeo maculis duabus, punctis inter antennis, scutello punctis duobus abdomineque fasciis quinque flavis, primo quadrato-emarginato.

Vespa quadrata, Panz. *Faun. Germ.* 63. 3 ♀?

Odynerus parietum, pt., Sauss. *Mon. Guêpes Sol.* 130. 10.

Female. Length 5–6 lines.—Black, punctured, and variegated with yellow; closely resembling *O. parietum*. Differs from the latter species in having the clypeus truncated at its anterior margin, the angles not subdentate; very rarely having more than a single spot on each side of the clypeus, the anterior spots obsolete; the thorax distinctly, and obviously, more elongate. Abdomen: the first segment with the sides nearly parallel, not narrowed towards the thorax, as in *O. parietum*; above yellow, and widely quadrate-emarginate; the second segment proportionably longer, and less swollen at the sides.

The *Male* differs from that of *O. parietum* in being more strongly punctured; in having the tegulae usually black; the legs not so clear a yellow, and more liable to be stained with black or ferruginous; it has also usually two yellow spots on the clypeus; the abdomen differs in the same particulars as the female from *O. parietum*.

In separating this insect—which I have bred, and of which I possess males and females agreeing with each other in differences of sculpture and form—from *O. parietum*, I do not forget that local varieties of a species are of common occurrence. I have great doubt of Panzer's insect being the one I have described, and I am quite aware that it may hereafter be proved that I have only separated a variety; be that as it may, it is a subject requiring further investigation; but I believe them to be distinct species.

9. *Odynerus trifasciatus*.

O. elongatus; clypeo antennisque atris; abdomine fasciis tribus flavis.

Vespa trifasciata, *Oliv. Encycl. Méth.* vi. 688.

Fabr. Syst. Piez. 264. 60.

Vespa quadricincta, *Fabr. Syst. Piez.* 262. 46.

Vespa Gazella, *Panz. Faun. Germ.* 53. 10.

Vespa yunceae, *Christ. Hym.* 245. pl. 23. f. 8.

Odynerus trifasciatus, *Spin. Ins. Lig.* ii. 184.

Wesm. Mon. Odyn. Belg. 7.

Sauss. Mon. Guêpes Sol. 211. 100.

Odynerus tricinatus, *Herr. Schöff. Faun. Germ.* 173. 20. 176?

Female. Length $4\frac{1}{2}$ – $5\frac{1}{2}$ lines.—Black; a yellow spot between the antennæ and a minute one behind the eyes; a small yellow spot at the base of the mandibles, and the scape more or less ferruginous or yellowish towards the apex beneath. Thorax elongate; the prothorax bordered with yellow in front, and two yellow spots on the scutellum. Abdomen: the first segment rather broader than long; the three basal segments bordered with yellow, sometimes a narrow border on the fourth more or less abbreviated at the sides; the tibiæ yellow in front, the posterior pair entirely so at their base; the apical joints of the anterior tarsi ferruginous; the wings with a fuscous border, the tegulæ rufo-piceous.

The *Male* differs in having the mandibles, clypeus, and scape in front, yellow; the yellow border on the prothorax very narrow and slightly interrupted, and the scutellum black; the tibiæ yellow, with a black stain behind; the tarsi yellow, stained with ferruginous; abdomen seldom having a fourth yellow fascia.

This very distinct species is generally distributed, and frequently found in the London district. It forms its burrows in old palings, &c. I have several times reared it from such materials.

10. *Odynerus trimarginatus*.

O. niger; clypeo antennisque atris; thorace margine antico abdomineque fasciis flavis; tibiis tarsisque ferrugineis.

Odynerus trimarginatus, *Zett. Ins. Lapp.* 456. 4.

Sauss. Mon. Guêpes Sol. Supp. 212. t. 10. f. 9.

Odynerus Scoticus, *Curtis, Brit. Ent.* iii. 138.

Ancistrocerus trimarginatus, *Smith, Cat. Vesp.* 53. 22.

Odynerus quadricinctus, *Herr. Schöff. Faun. Germ.* 173. 24. 176. t. 15 ♀.

Female. Length 5-5½ lines.—Black; a spot between the antennæ, and a minute one behind each eye, yellow; the scape of the antennæ at its apex beneath, and the apical joint of the flagellum beneath, fulvous. Thorax: the border of the prothorax yellow; the knees, tibiæ and tarsi ferruginous, the anterior, and sometimes the intermediate pair also, with a black stain behind; the wings fulvo-hyaline, with a fuscous stain along the anterior border of the superior pair. Abdomen: the first, second and third segments bordered with yellow, that on the first a little widened at the sides of the segment, the second continued beneath.

The *Male* is rather smaller than the female, and differs from it in having the mandibles, clypeus, and scape in front, yellow, and four or five of the apical joints of the flagellum ferruginous; the legs are yellow, with ferruginous stains; the second and third fasciæ of the abdomen both continued beneath.

This pretty species is not found near London. I have taken it at Walmer and Kingsdown, Kent, during July and August; also at Pakefield and Lowestoft, Suffolk; it occurs in Scotland, and has been taken at Loch Rannoch, in Perthshire.

11. *Odynerus pictus*.

O. niger; thorace margine antico abdomineque fasciis quinque flavis; tibiis tarsisque flavo-ferrugineis.

Odynerus pictus, *Curtis, Brit. Ent.* iii. 138.

Sauss. Mon. Guêpes Sol. Supp. 210. t. 10. f. 10.

Odynerus constans, *Herr. Schöff. Faun. Germ.* 173. 29.

Ancistrocerus pictus, *Smith, Cat. Vesp.* 53. 21.

Female. Length 6 lines.—Black; head and thorax closely punctured; the clypeus slightly emarginate at the apex, the lateral angles subdentate; a yellow spot between the antennæ and a minute one behind the eyes. The prothorax with a narrow

yellow border; the legs reddish yellow or fulvous; the coxæ, trochanters, and greater portion of the femora black; wings fulvo-hyaline, the nervures brown, the anterior margin of the superior pair with a fusco-ferruginous stain, darkest in the marginal cell; the nervures pale ferruginous at the base of the wings, the tegulæ with their outer margin rufo-testaceous, sometimes yellow in front. Abdomen shining and finely punctured; the first five segments regularly bordered with yellow; the insect thinly covered with pale ferruginous pubescence.

Var. *a*. A pale yellow spot on the apical segment.

The *Male* is smaller than the female, and differs from it in having the mandibles, clypeus, and scape in front, yellow; the flagellum fulvous beneath.

This species is taken in the London district, but is not very abundant; it has been taken at Bristol, in the Isle of Portland, Isle of Wight, and at Weybridge—showing that it is widely distributed.

12. *Odynerus Antilope*.

O. niger; clypeo punctis duobus, prothoracis margine antico, scutello maculis duabus, abdominisque segmentis fasciis quinque flavis.

Vespa Antilope, Panz. *Faun. Germ.* 53. 9.

Vespa parietum, Panz. *Faun. Germ.* 49. 24.

Fabr. Ent. Syst. ii. 268. 53; *Syst. Piez.* 263. 52.

Odynerus biglumis, Spin. *Ins. Lig.* i. 89, & fasc. iii. 186. 4.

Odynerus Antilope, Wesm. *Mon. Odyn. Belg.* 32.

St. Farg. Hym. ii. 649. 34.

Sauss. Mon. Guêpes Sol. 132. 13.

Odynerus murarius, Herr. *Schäff. Faun. Germ.* 173. 26. t. 12. 1 ♀.

Female. Length 7-7½ lines.—Shining black; the head and thorax closely punctured; an interrupted semicircular stripe at the base of the clypeus, a spot on the mandibles, the scape in front, a spot between the antennæ, and a minute one behind the eyes, yellow; the flagellum fulvous beneath. The anterior margin of the prothorax, a spot on the tegulæ behind, two minute ones on the scutellum, and the tibiæ and tarsi, yellow; the tibiæ with a dark stain behind, and the tarsi more or less fuscous; the tips of the femora yellow; wings fulvo-hyaline, with a darker stain along the anterior margin of the superior pair. Abdomen delicately punctured, the basal segment most strongly so; the first and three following segments with yellow

marginal fasciæ; sometimes a fascia on the fifth, but usually a yellow spot on this, as well as on the apical segment; the fascia on the basal segment notched in the middle, that on the second and third continued beneath.

Male. Length 6 lines.—Differs in having the mandibles and clypeus yellow; the spot between the antennæ sometimes obsolete; the spots on the scutellum also obsolete: otherwise resembling the female.

This species is generally distributed. It provisions its cells with the larvæ of Lepidoptera. I have reared it from the egg; the burrow was formed in a sand-bank, whence I obtained the cell. It is very abundant in Yorkshire.

Fam. 2. Vespidae, Leach.

(SOCIAL WASPS.)

The anterior wings folded longitudinally, having three complete submarginal cells, the second receiving both the recurrent nervures; the eyes reniform, lateral, and extending to, or nearly to, the base of the mandibles; the claws of the tarsi simple. The societies consist of Males, Females, and Workers.

The only genus belonging to this group found in this country is the typical one, *Vespa*, of which eight species have been discovered to be indigenous. The most beautiful examples of insect architecture are the works of different species of the family *Vespidae*; in order fully to appreciate this, it will be necessary to examine and study carefully a series of nests constructed by the various genera of Wasps inhabiting Brazil and South America; amongst these, the endless variety of form, the different materials used in their construction, and the various textures consequently produced, cannot fail to excite our wonder and admiration. The nests of the Social Wasps of this country are works of great beauty; and when we examine and see the differences in the construction, the adaptation of the nest to the circumstances likely to ensue in the various situations in which we find them, we are astonished at the amount of intelligence displayed. When the common Wasp (*Vespa vulgaris*) builds her nest in the ground, it is enveloped in a different covering to that which is constructed when the nest is built under a roof, on a beam, or other similarly protected situation: the ground nest has a number of thin papyraceous leaves folding over each other,

and capable of resisting a considerable amount of moisture ; whilst the nests found in outhouses, &c., are covered with a beautiful texture having the appearance of shell-work : this has been the case in all instances which have come under our notice.

It is not our purpose here to enter upon a general description of wasps' nests ; but a brief account of the proceedings of one British species may not be out of place. A wasp's nest is commenced by a single individual—a female that has passed the winter in a state of torpidity ; the genial warmth of spring arouses her from her lethargy, and she issues forth in search of a suitable place in which to commence the foundation of the vesparium. Having found some hole in a situation adapted to her purpose, she proceeds to enlarge it and to form a subterranean chamber of suitable dimensions : her next operation is to collect materials wherewith to lay the foundation of the nest itself ; this is constructed of the raspings or scrapings of different kinds of wood ; having procured a supply, she first constructs a footstalk sufficiently strong to support the first two or three layers of cells ; at the end of the column or footstalk she forms three cup-shaped receptacles ; these are of course reversed, hanging bellwise ; the depth of each is about the tenth of an inch. The wasp now constructs a covering over the foundation-cells like an umbrella, an egg is deposited in each cup, and she then proceeds to construct additional ones, depositing an egg in each as soon as completed ; by this time the eggs first deposited are hatched, and the larvæ now require a portion of her attention. The larvæ of wasps grow rapidly, and, with the growth of the grubs, she from time to time raises the walls of the cells ; the cells in the foundation-comb are never carried up higher than the length of the larva ; as it increases day by day, the wasp adds a fresh course of wall until the larva is full-grown, when it covers itself in by spinning a convex cap to the cell, of a tough, white, silky texture. The angles of the planes of the hexagons are determined by the points of contact of the circular bases ; from these the wasp gradually commences the flattened sides of the hexagons, at first a little curved ; but at a slight elevation the sides become perfectly flattened planes, and as such are carried up to the required height. Thus the gradual raising of the walls is as regular and progressive as that of a bricklayer constructing hexagonal chimneys ; each additional layer is laid upon the previous one, which has had time to become hard and suitable for supporting the additional weight of wall required. It may be briefly noticed that wasps do not at all times construct cup-shaped foundations. The species of the genus *Polybia* (Brazilian wasps) lay cup-shaped foundations for their first cells ; but as

the comb increases in dimensions they construct a flat roof or covering; when the first comb is completed they commence to build upon the flattened roof, laying the hexagonal foundations at once, sharp and angular, from the flattened roof; one, two, three or more planes are in different instances to be seen, merely as it were chalked out by the slightest amount of elevation possible. It is a fact worthy of notice, that the cells in the foundation-comb of the nest of a social wasp are always amongst the smallest, if not the very smallest, to be found in the nest when it is completed, and these are constructed by one of the largest individuals in the community—the female; whilst towards the end of the season, the largest cells, those of the males and females, are constructed by the smallest wasps—the workers, the foundation-cells being in fact too small even to admit of the head of the female,—proving that the walls are built up exteriorly, not excavated or dug out, as has been stated to be the case in the construction of the combs of the Hive-Bee.

Three of the species of British wasps build their nests in trees or bushes; the form of construction corresponds with that of the ground wasps; but they are of a much firmer texture, and capable of resisting the effects of wind, rain, and changes of temperature to which they are necessarily exposed.

The Social Wasps are amongst the most courageous of the insect tribe, some of the *Formicidæ* alone perhaps equaling them. Wasps, however, seldom attack when unmolested; but should their citadel be threatened, with a courage every one must admire, they boldly and perseveringly resent such attempts. We, who have made companions of them in our own apartment, can testify to their never attacking those who leave them unmolested to pursue their industrious avocations. From the much-abused, and too often cruelly treated wasp, we may learn an admirable lesson of parental care, of courage in the defence of her young brood, and of careful and cleanly housewifery, no particle of rubbish of any kind being suffered to strew her dwelling. The number of individuals which compose the different communities of the species varies considerably; nests which I have examined, taken in autumn, fell very far short of that estimated by Reaumur as likely to be found in a populous community, namely 30,000: the largest number that I ever obtained was 2590; to this amount must be added about 100 which were not in the nest when the community was destroyed, but which were assembled about the spot whence it was taken the next morning. It is very clear from Reaumur's account that he estimated the entire number of cells, 10,000, and then supposed each might have cradled three successive larvæ, which can

scarcely be correct: the cells of the males and females, I believe, only serve for one brood; I have never traced more than a single lining in these cells.

There is a point which I have more than once witnessed in the history of Wasps, which does not appear to have been recorded. In the spring I have found as many as three nests in a bank, not more than 200 yards apart; and on visiting the spot a month or so later, I observed no wasps issuing from the first nest, and on digging into the bank discovered that it was deserted—a single empty comb alone remained. I then passed on to the second nest, and was surprised to observe a few wasps come out, each carrying something away; at length I captured one, and found it was conveying larvæ from the nest; I traced them in their flight, and was astonished to see a wasp enter the third nest with a larva from the nest no. 2: here then is a mystery which time will unravel, but which I am unable to determine. Were the larvæ carried off to be nursed, and so add to the strength of the swarm; or were they destined to become the food of the larvæ in the nest of the free-hooter community? I have several times observed that swarms had deserted their nest, but have only once witnessed anything which would in any way account for such a proceeding.

I have frequently observed a brood of wasps, at the close of autumn, when they are smitten with a consciousness of their inability to feed and rear the young brood in the combs, busily engaged in removing the grubs from the nest; but I have never witnessed their scattering them about the entrance, as related in Kirby and Spence's 'Introduction'; on all occasions I have seen them fly off to a considerable distance, each carrying a grub, when they dropped it, and again returned to assist in removing the remainder. Such scenes as are described in the work referred to can only be occasional, induced by some pressing necessity.

Genus 1. VESPA.

Vespa, pt., *Linn. Syst. Nat.* i. 948 (1766).

Craebro, pt., *Christ. Hym.* 217 (1791).

Sphex, pt., *Sulz. Hist. Ips.* (1761).

The labium short, broad, and deeply notched at the apex, which has two terminal glands; the paraglossæ shorter than the labium, each terminating in a gland; the labial palpi 4-jointed, the two basal joints large, of about equal length, the third half the length of the second, the fourth minute; the maxillary palpi 6-jointed. Clypeus large, its anterior margin

slightly and widely emarginate, the angles produced, usually subdentate. Mandibles oblong-quadrate, obliquely truncate at the apex, and tridentate. Eyes notched internally, reaching to, or nearly to, the base of the mandibles. Antennæ geniculated and simple in all the sexes. Thorax subglobose; the metathorax truncate. Abdomen sessile and cylindrical.

Section 1. GROUND WASPS.

The scape of the antennæ black in the females and workers.

1. *Vespa vulgaris*.

V. capite thoraceque nigris flavo-variis; abdomine flavo, segmentis singulis nigro-bimaculatis, segmenti primi margine basali nigro-fasciato.

Vespa vulgaris, Linn. *Faun. Suec.* 415. 1671; *Syst. Nat.* i. 949.

4 ♀; and *Cab. Mus. Linn. Soc.*

Scop. Ent. Carn. 825.

De Geer, Ins. ii. pt. 2. 766. t. 26. f. 1-15.

Fabr. Syst. Ent. 364. 9; *Ent. Syst.* ii. 256. 10; *Syst. Piez.* 255. 9.

Harris, Expos. Engl. Ins. 128. t. 37. f. 5.

Frisch, Ins. ix. t. 12. t. 2.

Christ. Hym. 236. t. 22. f. 2.

Panz. Faun. Germ. 49. 19.

Don. Brit. Ins. vii. t. 266.

Kirby, Faun. Bor. Amer. 263.

Ratz. Forst. Ins. Bd. iii. 51. 2.

St. Farg. Hym. i. 516. 14. t. 10.

Zett. Ins. Lapp. 2nd ed. p. 453.

Herr. Schöff. Faun. Germ. 179. 3a. p. 36.

Smith, Zool. i. 162. f. c ♀, and ix. *Append.* clxxvi.

Sauss. Mon. Guêpes Soc. 113. 2. t. 14. f. 3.

Female. Length 9 lines.—Black; the mandibles, clypeus, a crown-shaped spot between the antennæ, a line on the inner orbit of the eyes, terminating in their sinus, and also the outer orbits, yellow; the clypeus with a black line down the centre, usually terminating in a broad angular spot before the anterior margin; the teeth of the mandibles black. Thorax: an oblique line on each side before the tegulæ, two spots on the scutellum, and two on the post-scutellum, yellow; a yellow spot beneath the wings; the tibiæ, tarsi, and tips of the femora, yellow. Abdomen yellow, with the base of the segments black, the black bands produced into a point in the

middle; the second and following segments with a black dot on each side.

Var. *a*. The black dots united to the black basal band on one, two, or all the segments.

Var. *β*. The line on the clypeus without the angular termination, or with one or three spots.

Worker. Length $5\frac{1}{2}$ –7 lines.—Very like the female, but differs in having a large yellow spot on each side of the metathorax; the basal segment has an angular spot in the middle, and a dot on each side, black; the black dots rarely united to the black bands.

Male. Length 6–8 lines.—Differs in having the scape yellow in front; the markings of the clypeus differ, as in the female; the scutellum and post-scutellum as in the worker; the abdomen has a black band at its base, as in the female, and the segments are similarly spotted; the spots are, however, more frequently united to the black basal bands.

Found in all parts of the United Kingdom, usually appearing in April; but on the 13th of February, 1359, the weather being unusually mild, a female was seen on the wing at Hampstead. Mr. Wollaston found the female very abundant under stones on the extreme summit of Yribon Oernant, near Llangollen, in September 1854; probably hibernating for the winter.

2. *Vespa Germanica*.

V. capite thoraceque nigris flavo-variis; abdomine flavo; segmentis singulis nigro-bimaculatis, segmento primo trimaculato-nigro.

Vespa Germanica, *Fabr. Ent. Syst.* ii. 256. 12 ♂; *Syst. Piez.* 256. 10.

St. Farg. Hym. i. 515. 13.

Panz. Faun. Germ. 49. 20 ♂.

Ratz. Forst. Ins. Bd. iii. 51.

Herr. Schüff. Faun. Germ. 179. 2. p. 35.

Smith, Zool. ix. *Append.* clxxvii.

Sauss. Mon. Guêpes Soc. 116. 3. pl. xiv. f. 4, 4a, 4 c.

Female. Length $8\frac{1}{2}$ –9 lines.—Very like *V. vulgaris*, but known at once by the three spots on the basal margin of the first segment of the abdomen; the clypeus has sometimes a central black line descending to the middle, or only three minute black spots.

Worker.—Usually larger than those of *V. vulgaris*; the large workers considerably so, but difficult to distinguish from them,

the best character being apparently the crown-shaped spot above the clypeus (see Plate V.). In *V. vulgaris*, the halberd-shaped spot is almost always to be seen on the clypeus; in *V. Germanica* it is rarely found, but in its place an abbreviated line at the base, and two minute spots at its extremity.

Male.—Very like a variety of *V. vulgaris*, which has three spots on the basal segment, and the lateral spots on the other segments separated from the black basal bands; in this species they are very seldom, if ever, united, whilst in *V. vulgaris* they are usually so. The insect is also much less pubescent, particularly the abdomen.

Not so abundant about London as *V. vulgaris*, but apparently as widely distributed in Britain.

3. *Vespa rufa*.

V. nigra, flavo (rufoque) variegata; thorace utrinque linea humerali, scutelloque punctis duobus flavis; abdominis segmentis flavo-marginatis, duobus primis medio rufis aut flavis.

Vespa rufa, Linn. Faun. Suec. 416. 1672; Syst. Nat. i. 949. 5; & Cab. Mus. Linn. Soc. ♀.

Fabr. Syst. Ent. 364. 10; Ent. Syst. ii. 258. 15; Syst. Piez. 256. 13.

Schrank, Ins. Austr. 390. 788.

Christ. Hym. 236. t. 22. f. 3.

Latr. Hist. Nat. des Crust. et Ins. xiii. 352. 5.

Zett. Ins. Lapp. 454. 4.

St. Farg. Hym. i. 517. 15.

Curtis, Brit. Ent. xvi. t. 760 ♂, ♀.

Smith, Zool. i. 167. 3. f. g ♂, h ♀, i ♂.

Sauss. Mon. Guêpes Soc. 120. 4. t. 14. f. 5.

Female. Length 8 lines.—Black; the mandibles, clypeus, and a crown-shaped spot above, a line on the lower margin of the sinus of the eyes, and an abbreviated line behind them, yellow; the clypeus with an anchor-shaped black mark in the middle, the line in the middle sometimes abbreviated. Thorax: an oblique line on each side before the tegulæ, and two spots on the scutellum, yellow; a spot beneath the wings, and the tibiæ, tarsi, and tips of the femora, yellow, more or less stained with ferruginous. Abdomen yellow, with three transverse spots, usually united by a ferruginous stain; the second segment with a broad black band at the base, and three transverse spots beyond, the central one usually united to the black band, which is widest in the middle, the spots surrounded more or less by

ferruginous stains; the following segments with two black spots.

Var. *a*. The scape yellow in front—*very rarely*.

Worker. Length $5\frac{1}{2}$ –6 lines.—Agrees with the female in colouring, but varies perhaps more in the colouring of the abdomen, the first two segments being in rare instances almost entirely rufous.

Male. Length 6–8 lines.—The scape yellow in front; the line on the outer orbit of the eyes extends from their summit to the base of the mandibles, and that in the sinus of the eyes is continued down to the clypeus; the abdomen is coloured similar to the other sex, but differs in sometimes having the lateral spots united to the basal black band. The variety is very rare; the antennæ reaching to the margin of the second segment of the abdomen.

A rare variety of the *female* has a transverse black band on the first abdominal segment; the usual three black spots on the abdomen are replaced by a transverse stripe, at the ends of which is an oblique line, which runs upwards, and unites with the basal band enclosing a rufous spot.

This species is not so plentiful as the two preceding, but is very widely distributed: from a nest which I obtained in Yorkshire I bred numerous specimens of *Chrysis ignita*, and five of *Anomalon vespillum*.

Section 2. TREE-WASPS.

The scape of the antennæ yellow in front in all the sexes.

4. *Vespa arborea*.

V. nigra, flavo-picta; clypeo flavo, nigro tripunctato; abdomine flavo, nigro-picto (*V. rufa* simillima).

Vespa borealis, *Smith*, *Zool.* i. 170. 6. f. 1 ♀ (nec *Kirby*, nec *Zett.*).

Vespa arborea, *Smith*, *Zool.* vii. *Supp.* p. 1x.

Sauss. *Mon. Guêpes Soc.* 122. 5. pl. 14. f. 8 ♀.

The same size as *V. rufa* ♀, and similarly coloured, but having very rarely any tinge of rufous; the clypeus more produced, emarginate, and the angles subdentate, never having a central line, but only three minute dots: it also differs from *V. rufa* in having the legs stouter, longer, and very pubescent; the colour of the abdomen is different, being sulphur-yellow; the crown-

shaped spot above the clypeus is larger, and deeply notched above; the first segment of the abdomen is visibly longer.

First discovered by myself in 1836, near Wakefield, Yorkshire, building nests in fir-trees. I possess a specimen of what I think will prove to be the worker; it differs from *V. rufa* in having two spots on the scutellum and two on the post-scutellum. This species has also been taken in Scotland, and M. de Saussure has found it near Geneva.

5. *Vespa sylvestris*.

V. nigra, flavo-variegata; mandibulis ab oculis remotis; abdominis fasciis paulo triemarginatis.

Vespa sylvestris, Scop. *Ent. Carn.* 309. 826 ♀.

Christ. Hym. 235. t. 22. f. 1.

Oliv. Encycl. Méth. vi.

Smith, Cat. Hym. Ins. Vespidae. 115. 5.

Sauss. Mon. Guêpes Soc. 123. 6. t. 14. f. 6.

Vespa parietum, Harris, *Expos. Eng. Ins.* 128. t. 37. f. 4 ♂.

Vespa holsatica, Fabr. *Ent. Syst.* ii. 257. 14; *Syst. Piez.* 256. 12.

Latr. Ann. Mus. Hist. Nat. i. 288. t. 21. f. 1-3; *Hist. Nat.*

Crust. et Ins. xiii. 352.

Smith, Zool. i. 168. 4. f. k ♂, l ♀, m ♂.

Vespa crassa, Herr. *Schäff. Faun. Germ.* 179. 4. 34.

Vespa arbustorum, Blanch. *Hist. des Ins.* i. 62. t. 3. f. 2.

The campanular Wasp, Bingley, iii. 270.

Vespa vexator, Harris, *Eng. Ins.* 127. 37. f. 2, 3 ♂.

Female. Length $7\frac{1}{2}$ -8 lines.—Black; the mandibles, clypeus, a crown-shaped spot above, a line on the inner orbit of the eyes entering their sinus, the scape in front, and a stripe behind the eyes near their summit, yellow; the eyes not extending to the base of the mandibles; the face and cheeks with pale ferruginous pubescence, that on the vertex black. Thorax: an oblique line on each side before the tegulae, two spots on the scutellum, a spot beneath the wings, and the tibiae, tarsi, and tips of the femora, yellow; the apical joints of the tarsi slightly ferruginous; the thorax with pale ferruginous pubescence, that on the disk dark brown or black. Abdomen yellow, with a black band at the base of the segments; the black band produced into an angular point in the middle, those on the second and third segments with a little point on each side; thinly clothed with pale ferruginous pubescence.

Worker. Length 6-6 $\frac{1}{2}$ lines.—Resembles the female, but has usually a black dot on the clypeus, and the black fasciae have frequently a little point produced on each side of the second, third and fourth segments.

Male.—Of the same size and coloration as the worker, but having the antennæ longer than the thorax, and the black fasciæ seldom have the lateral black points.

This species is not subject to much variation; it is undoubtedly essentially a tree-wasp, but I have once or twice found it inhabiting an underground nest. It is not a very abundant species, but certainly widely distributed. I have observed it to be very partial to the flowers of the *Ballota nigra*, particularly in situations on or near to the sea-coast.

6. *Vespa Norvegica*.

V. nigra, flavo-varia, villosa; abdominis segmentis flavo-marginatis, primo rufo-vario, secundo maculis duabus rufis (♀), quandoque (♀).

Vespa Norvegica, *Fabr. Spec. Ins.* i. 460. 11; *Ent. Syst.* ii. 258. 16; *Syst. Piez.* 256. 14.

Vill. Ent. iii. 275. 20.

Oliv. Enc. Méth. vi. 680. 52.

Panz. Faun. Germ. 81. 16.

Zett. Ins. Lapp. 454. 5.

Herr. Schöff. Faun. Germ. p. 37.

Smith, Zool. x. 370. 1.

Sauss. Mon. Guêpes Soc. 128. 8. t. 14. f. 7.

Vespa Britannica, *Leach, Zool. Miscell.* i. 111. t. 50. 1 ♂, 2 ♀, 3 ♀.

Smith, Zool. i. 169. 5. f. n ♂, o ♀, p ♀.

Female. Length 8 lines.—Black, pubescent; the mandibles, clypeus, a transverse spot above, the scape in front, and a stripe behind the eyes towards their summit, yellow; a black stripe down the middle of the clypeus, anchor-shaped at its apex. Thorax: an oblique line on each side in front of the tegulæ, a spot on each side of the scutellum (frequently obsolete), a spot beneath the wings, the tibiæ, tarsi, and tips of the femora, yellow; the body beneath with pale fulvous pubescence. Abdomen: all the segments with a yellow border at their apical margins; all the borders, except the basal one, with a square united spot on each side, and a minute angular one in the middle; the yellow borders widened beyond the spot on each side; the second segment has sometimes a large ferruginous macula or stain on each side at its base.

Var. α. The flagellum fulvous beneath, a narrow yellow line on the inner orbit of the eyes, two spots on the scutellum, and a red spot on each side of the second segment of the abdomen.

Worker. Length 5-6½ lines.—This sex is coloured like the female, but is rarely found without the red spots on the abdomen; the two yellow spots on the scutellum are always present. The *Male* is more subject to variation than the worker; and some beautiful highly coloured examples occur, the first and second segments having the yellow replaced by red.

This is the true *Vespa Britannica* of Leach; the typical specimens described are in the Cabinet of British Hymenoptera in the Collection of the British Museum, with the name attached in the handwriting of Dr. Leach; the specimens are very well represented in the 'Miscellany.' The worker is depicted with the characteristic quadrate black spot on the second segment of the abdomen, and with the ferruginous tint on each side: the figure of the female is also good; the anchor-shaped black stripe on the clypeus is distinctly given. I have never seen a specimen without it; whilst in *V. sylvestris* I have always found the clypeus of the female immaculate, or at most with a minute black dot. British examples of the female of this species have only occasionally the *red spots* on the abdomen, and the *yellow ones* on the scutellum; in a fine series of specimens, bred from a nest in my own apartment, they were only one in twenty. It is impossible to decide whether the nest figured in the 'Miscellany' is *intended* to represent that of the wasps figured—probably not; it is in the British Museum, labeled "taken near Edinburgh." M. de Saussure has fallen into an error in supposing this species to be *V. sylvestris*; the nest figured may possibly be so, but the insects are undoubtedly *Vespa Norvegica*.

This species is rare in the South and West of England; it is not uncommon in Yorkshire, and is frequently found building in gardens in gooseberry-bushes; it also builds in fir-trees. In Scotland it is abundant; I have also received it several times from Ireland. Examples which I have seen from Northern Europe are much more highly coloured than British specimens.

A collector of Lepidoptera found this insect very troublesome at night when sugaring trees, &c., to attract moths; the wasps were enticed more numerously than the Lepidoptera, and represented being disturbed in their enjoyment.

7 *Vespa Crabro.*

V. magna; capite rufo, clypeo flavo; thorace rufo nigro-maculato; abdomine rufo-fusco, segmentis late flavo-marginatis.

Vespa Crabro, Linn. *Faun. Suec.* 1670; *Syst. Nat.* i. 948. 3; & *Cab. Mus. Linn. Soc.*

Reaumur. Mém. Ins. vi. 215. t. 18. f. 1.

Fabr. Syst. Ent. 364. 8; *Ent. Syst.* ii. 255. 9; *Syst. Piez.* 255. 8.

Scop. Ent. Carn. 824.

Schrank, Ins. Austr. 786.

Fourc. Ent. Par. ii. 430. 1.

Harris, Engl. Ins. 127. t. 24. f. 1 ♀.

Don. Brit. Ins. xiv. 85. t. 502.

Walcken. Faun. Par. ii. 90.

Latr. Hist. Crust. et Ins. xiii. 350.

Ratz. Forst. Ins. Bd. iii. 51. t. 4. f. 6 ♀.

Zett. Ins. Lapp. 35. 1.

St. Farg. Hym. i. 509. 7. pl. 9. f. 1, 2.

Sauss. Mon. Guêpes Soc. 130. 10.

Female. Length 13–14 lines.—Head ferruginous; a triangular spot between the antennæ, the sinus of the eyes, the mandibles, and vertex, yellow; the teeth of the mandibles black; the antennæ fuscous, more or less ferruginous towards their base. Thorax ferruginous, with a black patch on each side of the mesothorax, the pectus more or less black or fuscous; wings fulvo-hyaline, darkest anteriorly, the nervures ferruginous; the legs ferruginous, and covered with a shining pile. Abdomen: the first segment and basal half of the second ferruginous, the base of the first of a brighter red, the apical margin with a narrow yellow band; the ferruginous band on the second segment with its apical margin angulated in the middle, and with a united ferruginous spot on each side; the apical half, as well as the rest of the segments, yellow, each segment with a ferruginous or fusco-ferruginous spot on each side; beneath the base of the segments reddish brown, with a united spot of the same colour on each side.

Worker. Length 9–11 lines.—Of the same colouring as the female, but usually brighter.

Male.—The size of the worker, and similarly coloured; distinguished by having the antennæ longer than the thorax.

This species is widely distributed, but not, to my knowledge, found so far north as Yorkshire; nor am I aware of its being found in Ireland. It is very plentiful in Hampshire, usually building in decaying trees, sometimes under the eaves of houses, and it has been discovered building in a bank. I have observed it carrying on its building operations on a fine moonlight night as briskly as during the daytime.

APPENDIX.

THE following list of Ants'-nest Beetles is obligingly supplied by Dr. J. A. Power, who has most diligently collected these interesting insects for several years, and has thus been enabled to refer all the species of Beetles to those Ants in whose nests they are exclusively found, or most frequently met with. The arduous investigation of the connexion between the different species of Ants and the Myrmecophilous Coleoptera having for a long time engaged the attention of Dr. Power, renders this list highly valuable.

Myrmecophilous Beetles found in the nests of FORMICA RUFA.

- | | |
|--------------------------------------|--|
| Lomechusa strumosa, <i>Fabr.</i> | Leptacinus formicetorum, <i>Mærk.</i> |
| Myrmedonia humeralis, <i>Grav.</i> | Xantholinus ochraceus, <i>Gyll.</i> |
| Aleochara ruficornis, <i>Grav.</i> | (abundant in some nests, but possibly not Myrmecophilous). |
| (perhaps not truly Myrmecophilous). | |
| Thiasophila angulata, <i>Erichs.</i> | Dendrophilus pygmaeus, <i>L.</i> |
| — inquilina, <i>Mærk.</i> | Saprinus piceus, <i>Payk.</i> |
| Dinarda Mærkellii, <i>Kiesen.</i> | Monotoma angusticollis, <i>Gyll.</i> |
| Oxypoda formiceticola, <i>Mærk.</i> | — cornicollis, <i>Aubé.</i> |
| — hæmorrhœa, <i>Sahlb.</i> | The larvæ of Cetonia ænea. |
| Homalota anceps, <i>Erichs.</i> | The larvæ of Cetonia aurata. |
| — flavipes, <i>Grav.</i> | The larvæ of Clythra 4-punctata. |
| Quedius brevis, <i>Erichs.</i> | |

FORMICA FUSCA.

- | | |
|---------------------------------------|--|
| Heterius sesquicornis, <i>Preysl.</i> | Dinarda dentata (taken by J. J. Reading, Esq.). |
| Atemeles emarginatus, <i>Payk.</i> | Atemeles paradoxus (taken by J. J. Reading, Esq.). |
| Homœusa acuminata, <i>Mærk.</i> | |
| (taken by T. V. Wollaston, Esq.). | |

FORMICA FULIGINOSA.

Myrmedonia funesta, Grav.	Homalota confusa, Mærk.
— lugens, Grav.	Thiasophila inquilina, Erichs.
— cognata, Mærk.	Quedius brevis, Erichs. (rare with this ant).
— laticollis, Mærk.	Amphotis marginatus, Fabr.
— humeralis, Grav. (rare with this ant).	Batrissus venustus, Reichenb.
— limbata, Payk.	Abræus — ?
Falagria thoracica, Curtis.	Euryusa Kirbii, Jans. (taken by Mr. H. Squire).
Oxypoda vittata, Mærk.	

FORMICA FLAVA.

Claviger testaceus, Preysl.	Myrmedonia limbata (probably with <i>F. fusca</i> also).
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FORMICA SANGUINEA.

Myrmedonia Haworthi, Steph. (probably in the nest of this ant or in that of *F. rufa*).

MYRMICA RUBRA.

Atemeles emarginatus, Grav.

In the Nests of nearly all the Ants.

Astilbus canaliculatus, Grav.

Additions and Corrections.

Page 7. FORMICA BRUNNEA.—At the time this species was included in the British list, only a single specimen, a female, had been captured; but it has since occurred on the Suffolk coast at Pakefield.

Page 18. PONERA CONTRACTA.—This insect has been taken in a bakehouse in some numbers by Mr. H. Squire.

Page 39. MUTILLA EUROPÆA.—This insect was taken frequently by Mr. Bond, at night, by means of sugar placed upon trees to attract Lepidoptera; it was also seen at the sugar in the daytime: only females were observed.

Page 47. TIPHIA FEMORATA.—On examining one of the black-legged specimens in the Collection of the British Museum,

referred to by Shuckard, I find it registered with the locality Massachusetts; a second example is without a register number; a third specimen, without a ticket of locality, from the Stephenson Collection, is a distinct species, although closely resembling *T. femorata*.

Page 53. MYRMICA LÆVIGATA.—This species proves to be distinct from the *M. pallidula* of Nylander. I have received specimens of the large and small workers of *M. lævigata*; they were discovered in a hot-house by Mr. E. Parfitt, at Exeter: the species is undoubtedly identical with *Æcophthora pusilla* of Heer, the House-ant of Madeira. The large worker of *M. pallidula* differs from the same form of *M. pusilla* in having the sides of the head nearly parallel; in Heer's species, the sides of the head are gradually narrowed to the base of the mandibles. The small worker of the latter species has the head conspicuously narrowed before and behind the eyes; in *M. pallidula* it is very slightly so.

Page 89. LARRA ANATHEMA.—In the British Museum Collection there are four specimens of this insect; two were formerly in that of James Francis Stephens, Esq.; none of them have any ticket of locality attached, nor can I find any reference to them in the Museum registers.

PARASITES ON VESPIDÆ.

Names of Parasites.	Wasps attacked.	Authorities.
<i>Chrysis ignita</i>	<i>Odynerus spinipes</i> . .	Smith, &c.
— <i>bidentata</i>	Ditto	Smith, &c.
— <i>fulgida</i>	Ditto	Smith.
— <i>neglecta</i>	Ditto	Smith, &c.
<i>Hedychrum auratum</i>	Ditto	Smith.
<i>Chrysis ignita</i>	<i>Odynerus Antilope</i> .	Westwood.
— <i>cyanea</i>	— <i>trifasciatus</i> . .	Smith.
<i>Hedychrum auratum</i>	— <i>parietum</i> . . .	Smith.
<i>Cryptus bellosus</i>	— <i>lævipes</i>	Curtis.
— <i>ornatus</i>	Ditto	Smith.
<i>Anomalon vesparum</i>	<i>Vespa vulgaris</i> . . .	Curtis.
<i>Ripiphorus paradoxus</i>	Ditto	Germar, &c.
<i>Dromius linearis</i>	Ditto	Leach.
<i>Stylops</i> — ?	Ditto	Van Heyden.
<i>Volucella plumata</i>	Ditto	Smith.
<i>Chrysis ignita</i>	<i>Vespa rufa</i>	Smith.
<i>Anomalon vesparum</i>	Ditto	Smith.
<i>Chrysis Austriaca</i>	<i>Vespa Norvegica</i> . .	Smith.
<i>Quedius (Velleius) dilatatus</i> .	<i>Vespa Crabro</i> . . .	Gyllenhal.

EXPLANATION OF THE PLATES.

PLATE I.

- | | |
|--|--|
| Fig. | Fig. |
| 1. <i>Formica rufa</i> ♂. | 13. Antennæ of <i>Myrmica lippula</i> ♀. |
| 2. <i>Formica rufa</i> ♀. | 14. Antenna of <i>Myrmica nitedula</i> ♀. |
| 3. <i>Formica rufa</i> ♀. | 15. Antenna of <i>Myrmica fugax</i> ♀. |
| 4. Labial palpi of the worker of <i>Formica rufa</i> . | 16. Clypeus of <i>Myrmica fugax</i> ♀. |
| 5. Maxillary palpus of the worker of <i>Formica rufa</i> . | 17. Wing of <i>Myrmica scabrinodis</i> . |
| 6. Antennæ of the worker of <i>Formica rufa</i> . | 18. <i>Myrmica lippula</i> ♀. |
| 7. Antennæ of the ♂ of <i>Formica rufa</i> . | 19. <i>Myrmecina Latreillii</i> ♀. |
| 8. Labial palpi of <i>Myrmica scabrinodis</i> ♀. | 20. Wing of <i>Ponera contracta</i> ♀. |
| 9. Maxillary palpus of <i>Myrmica scabrinodis</i> ♀. | 21. Labial palpus of <i>Ponera contracta</i> ♀. |
| 10. Antennæ of <i>Myrmica scabrinodis</i> ♀. | 22. Maxillary palpus of <i>Ponera contracta</i> ♀. |
| 11. Antennæ of <i>Myrmica scabrinodis</i> ♂. | 23. Antenna of <i>Ponera contracta</i> ♀. |
| 12. Antennæ of <i>Myrmica lobicornis</i> ♀. | |

PLATE II.

- | | |
|--|--|
| 1. <i>Methoca ichneumonides</i> ♀. | tus, showing the form of the externo-medial nervure, at a. |
| 2. Anterior wing of <i>Methoca ichneumonides</i> ♂. | |
| 3. Anterior wing of <i>Tiphia femorata</i> ♀. | 9. A portion of the anterior wing of <i>Pompilus exaltatus</i> , showing the form of the externo-medial nervure, at a. |
| 4. <i>Tiphia minuta</i> ♂. | |
| 5. <i>Mutilla ephippium</i> ♂. | |
| 6. <i>Sapyga clavicornis</i> ♂. | |
| 7. <i>Pompilus rufipes</i> ♀. | 10. <i>Ceropales variegatus</i> ♂. |
| 8. A portion of the anterior wing of <i>Pompilus notatus</i> , showing the form of the externo-medial nervure, at a. | 11. <i>Aporus bicolor</i> ♀. |

PLATE III.

Fig.

1. *Ammophila sabulosa* ♀.
2. *Dolichurus corniculatus* ♀.
3. *Dinetus pictus* ♀.
4. *Miscophus bicolor* ♀.
5. *Astata boops* ♂.

Fig.

6. *Oxybelus mucronatus* ♀.
7. *Crabroquadrimaculatus* ♀.
8. *Crabro* (*Rhopalum*) *tibialis* ♀.

PLATE IV.

1. *Passalæcus gracilis* ♀.
2. *Trypoxylon attenuatum* ♀.
3. *Cemonus unicolor* ♀.
4. *Mellinus sabulosus* ♀.

5. *Didineis lunicornis* ♂.
6. *Gorytes bicinctus* ♂.
7. *Mimesa equestris* ♀.
8. *Cerceris arenaria* ♀.

PLATE V.

1. *Philanthus triangulum* ♀.
2. *Eumenes coarctatus* ♀.
3. Antennæ of the ♂ of *Eumenes coarctatus*.
4. *Odynerus crassicornis* ♀.
5. Antennæ of *Odynerus parietum* ♀.
6. Antenna of *Odynerus parietum* ♂.
7. Antenna of *Odynerus spinipes* ♂.
8. Intermediate leg of *Odynerus spinipes* ♂.
9. Intermediate leg of *Odynerus melanocephalus* ♂.
10. *Vespa Crabro* ♀. 10 a, the labium; 10 b, the labial palpi; 10 c, the mentum; 10 d, the maxillary palpus.
11. *Vespa arborea* ♀.
12. Head of *Vespa arborea* ♀.
13. Head of *Vespa vulgaris* ♀.
14. The yellow coronet-shaped spot above the clypeus of *Vespa vulgaris* ♂.

14 a, the double curve marks the basal line of the clypeus.

15. The coronet-shaped spot in *Vespa vulgaris*, showing the manner in which the two spots beneath are sometimes united to its base.
16. The coronet-shaped spot in the worker of *Vespa vulgaris*.
17. A variety of the same which frequently occurs.
18. The coronet-shaped spot in *Vespa Germanica* ♂.
19. The coronet-shaped spot in the worker of *Vespa Germanica* ♂.
20. The sexual organs of the ♂ of *Vespa vulgaris*.
21. The sexual organs of the ♂ of *Vespa Germanica*.
22. Head of *Vespa sylvestris* ♀.
23. Head of *Vespa rufa* ♀.

PLATE VI.

Fig.

1. Anterior wing of *Myrmosa melanocephala* ♂.
2. Anterior wing of *Harpactus tumidus*.
3. Anterior wing of *Miscus campestris*.
4. Anterior wing of *Tachytes pompiliformis*.
5. Anterior wing of *Nysson spinosus*.
6. Anterior wing of *Trypoxylon figulus*.

Fig.

7. Anterior wing of *Stigmus pendulus*.
8. Anterior wing of *Diodontus minutus*.
9. Anterior wing of *Spilomena troglodytes*.
10. Anterior wing of *Pemphredon lugubris*.
11. Anterior wing of *Ceratophorus morio*.
12. Anterior wing of *Psenater*.

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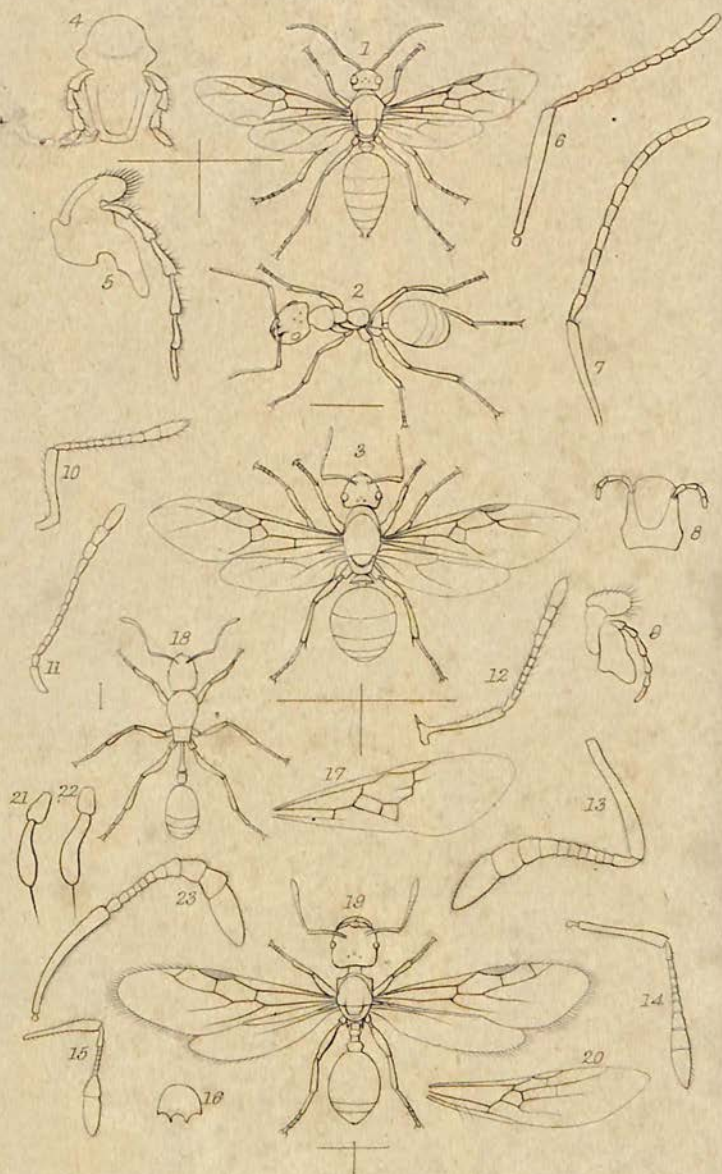
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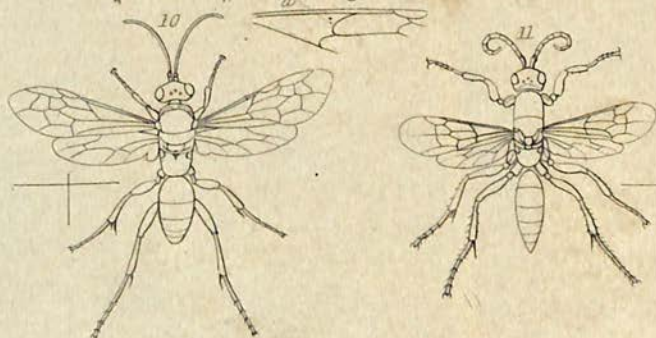
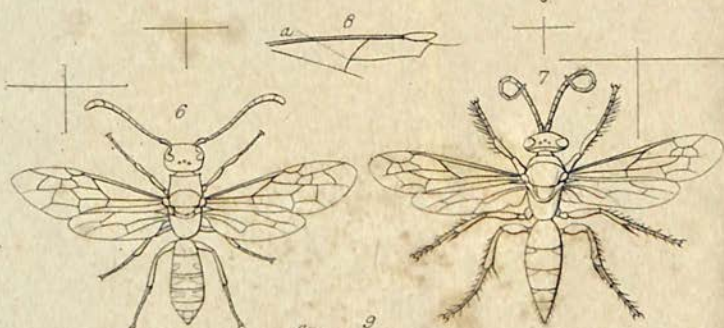
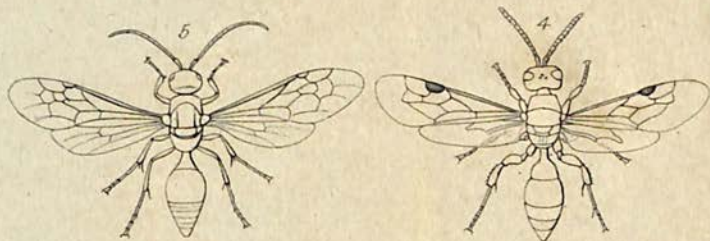
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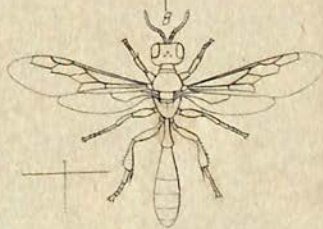
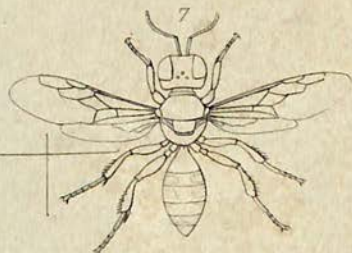
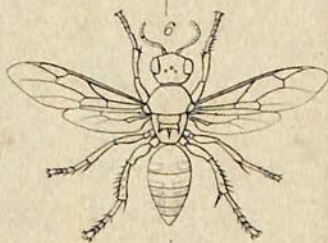
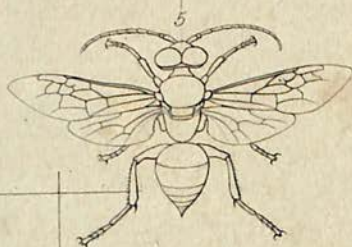
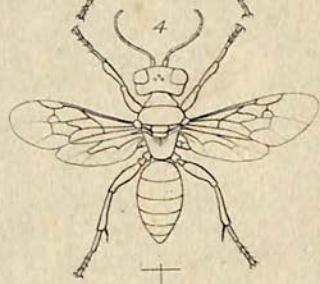
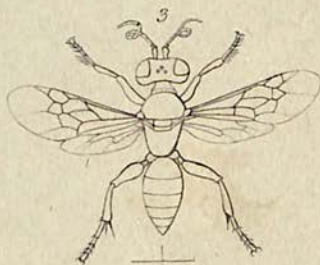
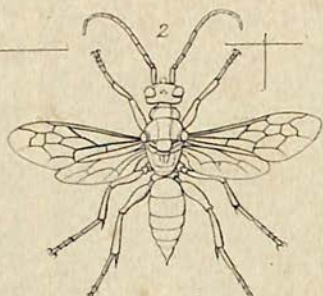
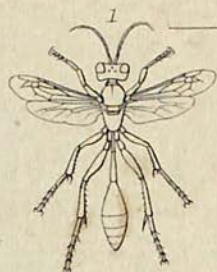
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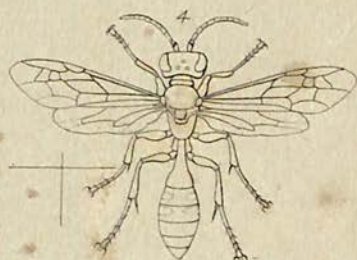
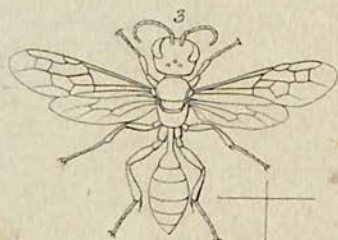
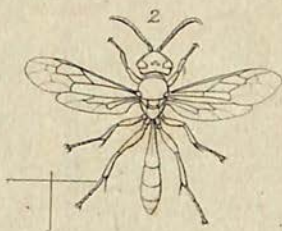






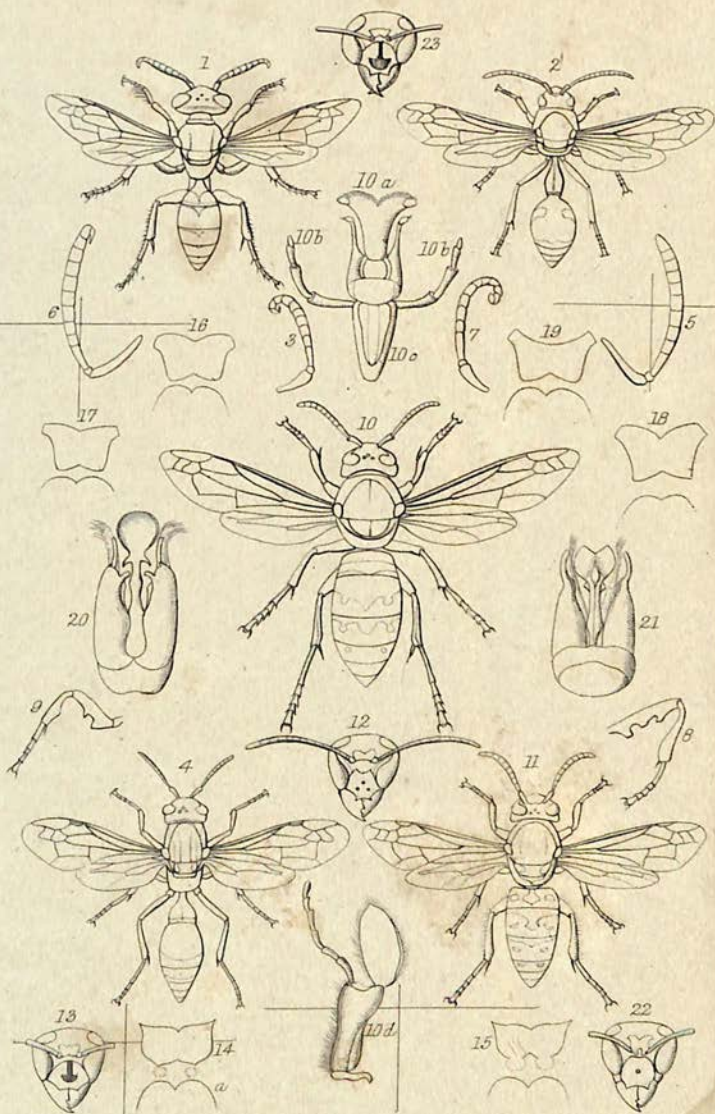
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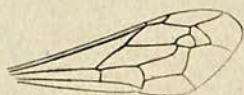
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